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Railway Age

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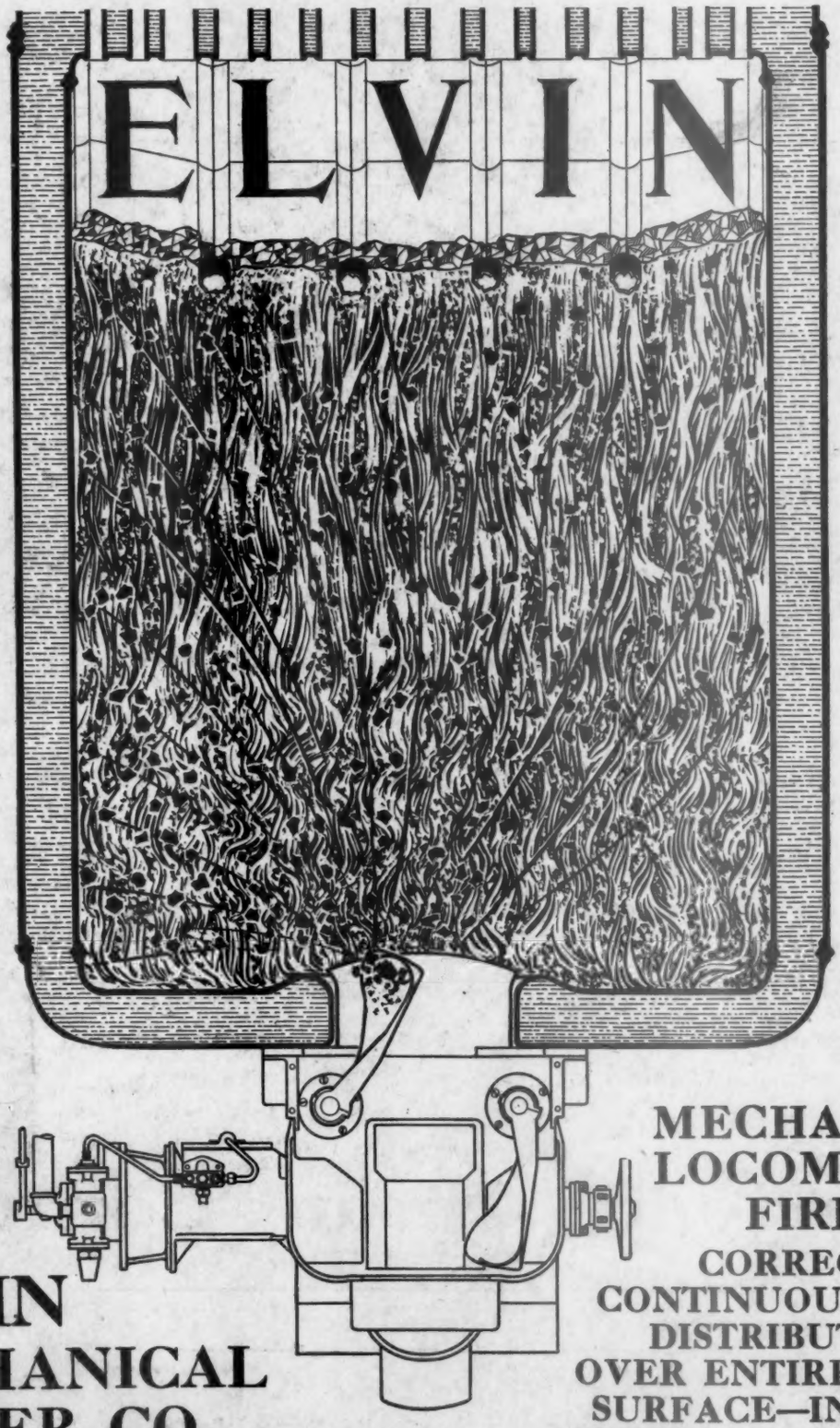

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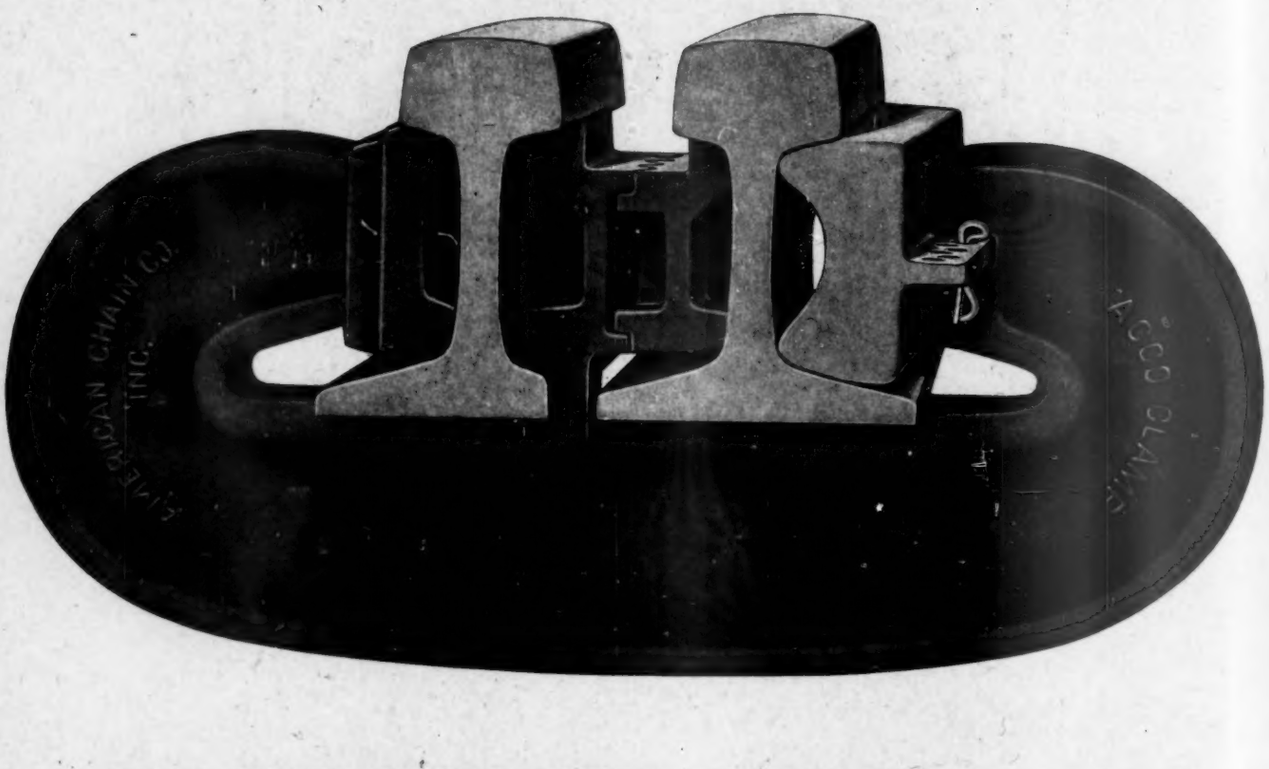

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The Labor Leaders' War Against Private Management

THERE IS AT PRESENT no important controversy going on regarding wages or working conditions between the railways and any class of their employees. Agreements have even been made between many of the railways and their striking shop employees. Agreements for approximately a year have been reached by most of the railways with the train service brotherhoods. There has been no dispute pending between the railways and the maintenance-of-way employees since these employees a few months ago were given a small increase in wages by the Railroad Labor Board. So far as wages and working conditions are concerned, there is at present a truce, if not actual peace, between most of the railways and their employees.

But while this is true the officers of most of the railroad labor unions in various ways, and especially through the columns of the weekly and monthly papers published by the unions, continue to wage war upon private management of railways, and to wage it in a most unfair way. They continue to present part of the facts about the railroad situation to employees, while withholding the rest of the facts, thus deliberately creating an erroneous impression. They continue to publish charges against the railway managements which are mainly or wholly untrue. It cannot be said that these things are being done in retaliation for anything the railway managements now are doing contrary to the real or suppressed interests of their employees.

In course of time there will undoubtedly be a renewal of disputes and controversies regarding wages and working conditions. This may be due either to efforts of employees to secure increases in their pay, or to efforts by the railways to secure reductions of it. We shall then have, as we have had in the past, demands for strikes from the rank and file of the labor unions, and we shall again hear Warren S. Stone, W. H. Johnston and other labor leaders of that class declaring that unless the demands they make are granted they will be "unable to hold their followers." They will profess to be conservative, but will say that their rank and file are growing radical. And to what will this radicalism among their followers be chiefly due? It will be chiefly due to the very propaganda which these self-styled "conservative" labor leaders are now disseminating, as they have been for years. Why do so many railway employees believe that the railways are greatly overcapitalized; that they are making excessive profits; that their rates are too high; that they are trying to "crush" the labor unions; and that only by strikes or government ownership can employees hope to get a square deal? Mainly because the so-called "conservative" leaders have told them so.

In fact that, while outwardly there is almost complete peace in the field of railroad labor at present, the propaganda to increase radicalism and promote government ownership is still being industriously disseminated by the labor leaders among railway employees, makes especially timely the open letter which Ben W. Hooper, chairman of the Railroad Labor Board, recently has sent to the editors of various labor union publications. Mr. Hooper became a member of the Railroad Labor Board less than two years ago. His early attitude as a member of the board clearly indicated that if, when appointed, he had any bias it was in favor of railway employees rather than in favor of the railway companies. In the performance of his duties, however, he has had forced upon his attention the radical propaganda being incessantly carried on by so-called "conservative" labor leaders and labor unions. As a fair and thinking man, he has been obliged to recognize the fact that obviously this is not intended merely or mainly to bring about improvements in the wages and working conditions of employees, but to poison the minds of the employees against private management, to break down their morale and render efficiency in operation under private management impossible, and thereby to force government ownership upon the country.

Mr. Hooper delivered a public address a few weeks ago in which he made clear he understood perfectly both the nature and purpose of this propaganda, and in which he denounced it. Having been criticized by a number of labor publications for making this address, he has written in reply the open letter to which we have referred, and which we publish elsewhere in this issue. It has required much courage for Mr. Hooper to express himself as he has. In doing so, however, he has unquestionably acted in the interest of railway employees, although they may not see it. Such propaganda as the labor leaders, in concert with radical agrarian politicians, socialists and communists, are conducting against private management will be seriously injurious to railway employees as long as private management continues. The immediate object of this propaganda is to force down the rates the railways may charge, and reduce the net return they are allowed to earn. But every reduction of rates and net return forces the railway managements to effect economies by laying off employees and seeking reductions of wages. Therefore, so long as private management exists, the more effectively such propaganda is carried on the worse it makes the railroad situation from the standpoint of the employees. There is no prospect of government ownership being adopted in the near future. Therefore, there is no immediate prospect of this propaganda being of any benefit whatever to railroad

employees. A very large part of the public understands exactly its purpose, and the longer it is carried on the more this large part of the public becomes determined to defeat its purpose and prevent government ownership.

Suppose, however, the labor leaders and other radicals should finally succeed in creating a railroad situation which would make the public feel it was obliged to adopt government ownership. The policy the labor unions are pursuing would result in government ownership being adopted when the public sentiment prevailing probably would cause also the adoption of legislation which would subject railroad labor to drastic regulation. Railroad labor, after all, has only a small part of the voting power of the country. The assumption upon which the propaganda for government ownership is carried on is that railway employees would be able to get much easier working conditions and higher wages under it than under private ownership. It is true that railway labor did get easier working conditions and higher wages from the Railroad Administration under government operation than it ever got before under private operation. But all the labor of the country got easier working conditions and much higher wages during the war than ever before. The fact is, that under private management railway labor in this country, before the war, was paid higher wages than ever were paid labor under government ownership in any other country. It received much higher wages than employees of the United States government, and the assumption that railroad labor would be paid better in future under permanent government management than under private ownership has little to support it. If one argued from the experience of the employees of the postal department he would probably reach the conclusion that under government ownership railway employees would be forbidden to strike, and would have far greater difficulties in getting satisfactory wages than they have had under private ownership.

The facts, then, are, first, that the anti-railroad propaganda now being carried on by labor leaders is injuring railway employees, and will continue to injure them as long as private management prevails; secondly, there is as yet no reason to believe that this propaganda finally will bring about government ownership; and third, if it should do so, there is no substantial ground for the assumption that the outcome would be beneficial to the employees.

Perhaps the most remarkable feature of the situation is that labor leaders such as Warren S. Stone and William H. Johnston constantly profess that they desire to eliminate the third parties, such as the Railroad Labor Board, and to deal directly, frankly and fairly with railway officers in order to settle in a friendly spirit all differences that arise between the managements and the employees. They even pretend to believe in the integrity and admire the ability of most railway managers. In spite of these facts, they go directly out from conferences with railway managers which have been conducted amicably and have resulted in agreements apparently satisfactory to both sides, and proceed at once to bespatter with mud the managements of all the railways, including officers high and low. They do not except from their bitter and unfair attacks even the railway managers who show the greatest disposition to be conciliatory and fair. No railway officer, however unimpeachable his character, or however friendly he may be to labor, no railway, however well managed, is exempt from attacks upon the ground that there is wholesale grafting on the railways, and that the railways are robbing or attempting to rob both their employees and the public.

The railway labor leaders constantly profess that the labor unions want peace in their relations with the railways. Every time there is a strike they try to make the public believe that the railways were the aggressors. How can these men even pretend to want peace when even at a time such as this when, so far as wages and working conditions are concerned, there is complete peace on many railways, they go right on carrying on a mud-slinging campaign to blacken the reputations of railway managers; to undermine the morale of the employees, and to create an adverse public sentiment, with the plain and even avowed object of destroying the entire present system of railway ownership and management?

They do not want peace. This is the plain fact of the matter. Since there cannot be peace as long as they continue to carry on their warfare against private ownership, it is high time there should be an increase in the amount of warfare carried on in defense of private ownership and management. It is high time that the war in defense of private ownership should be carried on as courageously, as energetically and as widely as the war against it. There never can be any real peace in the railroad business as long as the labor unions are led by men most of whose energies and efforts are being put forth to destroy private ownership; and railway managers and others who desire to maintain private ownership had best recognize the fact, and act accordingly.

Individual Fuel Records

A great deal of attention is given in modern railroad operation to statistics of averages for divisions or for railroads as a whole. Such figures can very properly be used for analyzing the results of operation and are of great value for that purpose. However, they do not give the information necessary for controlling operating methods, although many railroad officers attempt to use them for that purpose. A good example of the misuse of statistics is the common application of the average coal consumption, so familiar to every operating and mechanical officer. The performance of all locomotives for a month is lumped and compared with figures for the previous month or the same month of the previous year. If the figures show a decrease, everyone is satisfied. If there is an increase the higher officers ask why and the master mechanics, their foremen and the traveling engineers try to find the reason. The cause of the poor showing usually lies not in any far reaching general change but in the individual condition of the locomotives, or the individual carelessness of the crews. The statistics therefore furnish a basis for destructive criticism only and do not point out the causes for poor performance. What the men in direct charge of locomotive operation and maintenance need is information that will enable them to determine what locomotives and what crews are extravagant in the use of fuel. It is hard to convince a man that his method of operating or firing a locomotive is not economical without definite figures to back up the statement. It is practically impossible to inspect a locomotive so thoroughly that every defect that will affect fuel economy can be discovered. For these reasons a record of fuel performance on individual runs is of the utmost importance. The objection that is always raised to the individual

fuel performance record is that it requires considerable clerical work. But when the coal burned on a single trip may cost as much as $120, saving a very small percentage becomes important, and a record that will make it possible for the supervising officers to work more effectively to overcome the losses should be worth many times what it would cost. The best evidence of the value of individual fuel records is the fact that roads which are using them are convinced that they are without question a great help in cutting down expenses.

Extensive Economies on Single Tracks

The extensive opportunities to reduce the cost of railroad operation by the installation of automatic block signals on single track lines are very evident from the report of the Interstate Commerce Commission covering signal statistics. Of approximately 260,000 miles of road in service some 200,000 miles are single track. Of this amount 63,406 miles are protected by manual block signals and 19,444 miles, or only 9.7 per cent, are protected by automatic block signals. The remaining 117,000 miles of single track that is not equipped with either manual or automatic block signals is largely branch lines on which the traffic does not justify an expenditure for signaling. However, the gradual increase in traffic, particularly during recent months, has shown that increased track capacity is necessary at once on many single track lines to handle the further growth of business. The advantages of signaling on single track as a means of increasing track capacity are so evident to those roads with installations in service, that further requests for such work are receiving first consideration. As a means of demonstrating what single track signals will do, let any road pick out a ruling grade or a terminal where repeated congestion and delays are evident from the dispatcher's sheet. Automatic signals on a ruling grade will permit the closer spacing of slow speed freights, thus clearing this stretch of track much quicker. Automatic signals for a few stations on both sides of a terminal will also permit the closing up of train spacing at the end of or starting of the run. The situation is summed up in the relative advantages of the 1-mile block as compared to 5 or 8-mile blocks. Considering the facts presented it is evident that the signaling of single tracks has not been given adequate consideration. To roads confronted with the necessity of increasing the capacity of certain single track lines, short installations of signals are especially recommended over grades, in the neighborhood of terminals and at other places where congestion is likely to occur.

Making Friends for the Railroad

Talk to the average business man and have him tell you of difficulties he has had with the railroads. Analyze his remarks and what will you find? In a great majority of the instances the failure on the part of the railroad will be found to be due to ignorance, inattention or discourtesy on the part of some employee. In general, two factors are responsible for this: (1) Inadequate training of the employee, coupled with the lack of proper supervision; (2) lack of loyalty on the part of the employee. The management is primarily to blame for these things. The lack of loyalty—if we may judge from the spirit of the editorials and articles in some of the current magazines of the railroad labor unions—is little less than startling. This must first be corrected if the right kind of service is to be rendered to the public; it must be corrected if the relations with the public are to be improved as much as is desired. Unless public relations are made better, the railroads will fare badly with the legislative bodies. They have been over-regulated to a notorious degree—they face strangulation. Other industries have put their houses in order in the matter of employee relations and have their men enthusiastically behind them. Railway executives will be judged by the degree to which they make good in this respect. Some of them have already made good progress in improving conditions. The following is taken from a letter recently received from a railway officer: "We may not have progressed on our line as far as some of us idealists would like to see it, in securing the last word in employee co-operation, but it certainly cannot be said of us that our management is not striving toward that end * * *. The best proof of my statement is that our operating ratio has shown a greater decrease than * * *."

"Cost History or Cost News"

In a paper presented before the Institute of Locomotive Engineers in March, 1922, a prominent English shop production expert had this to say about cost determination methods: "Too great a stress cannot be laid upon the obtaining of accurate detailed costs as soon as possible, bearing in mind that *cost history* is not of much use, and *cost news* is what is required. The old system of costing up a job after it was finished is not good enough * * *. The main object should be to get detailed cost information immediately the jobs are in operation so that any excess cost may be at once investigated instead of waiting until the whole job or parts are machined or fitted. In this way we have found operations costing as much as 300 per cent more than the estimated time to machine and fit, and investigation has shown the problem of reduction to be comparatively simple, the excess being perhaps due to too much machining allowance on castings, bad forgings, inadequate equipment, etc." The author of the paper, A. E. Howell, referred to cost systems in locomotive manufacturers' plants but his remarks apply with almost equal force to locomotive repair shops. Unquestionably the cost systems now used in American railroad shops are in many cases too slow working to be of the greatest value even if they were everything that could be desired in the way of accuracy. Frequently, locomotive repair and shop order costs are not available until weeks after the locomotives and shop orders have left the shop. It is not easy to devise a flexible, accurate and rapid-working cost system in just the amount of detail required for railroad shops, but the need of such a system for the intelligent control of shop operations is evident. To be of maximum value, shop cost systems must give accurate information which can be classified as news rather than history.

D., T. & I. Has Deficit for 1922

The fact may not be of particular importance but those who recall the amount of bragging that was done for the Ford management of the Detroit, Toledo & Ironton during the first few months after he took control of it may be interested in noting the fact that it has just reported to the Interstate Commerce Commission a deficit for 1922 of $158,984; not so large as the deficit for the last year of the former management, but as compared with a net of $43,322 for 1921. While the revenues for the year, $9,004,474, were $2,550,805 greater than in 1921, the operating expenses, $7,503,642, showed an increase of $2,096,881 and the equipment rents showed a debit balance of $1,446,508, or $651,445 greater than in 1921. A large part of the increased expense, however, was represented by increased maintenance, on which $1,390,714 was spent in excess of the amount for 1921,

which indicates that an attempt has been made to improve the conditions of the property rather than to make a favorable net showing. The operating ratio for the year was 83.3, a decrease of 0.5 per cent as compared with the year before, while the ratio of maintenance expenses to revenues increased 4.3 per cent to 43.7. For the month of December there was a net operating income of $147,940, an increase of $479,180 as compared with December, 1921, whereas for several preceding months there had been a deficit. There was an increase of $424,231 in revenues for the month while operating expenses showed a reduction, including a reduction of $77,000 in maintenance.

A Limitation on Automatic Block Signals

IN A BLINDING SNOW STORM, accompanied by high wind and very low temperature, the absolute block system is the only proper method of spacing trains on either double track or single track. "Stop and Proceed" signaling is not safe. This has been the creed of this journal for many years; though how many actual followers of the practice could be counted, we do not know. The natural and laudable propensity of energetic operating officers and locomotive runners to complete all runs without admitting defeat, is quite likely, now and then, to lead to errors of judgment which amount to recklessness.

This subject comes up in connection with three collisions, killing four men, which occurred on the Union Pacific in the Rocky mountains on the night of the 4th of November, last, and are reported in another column of this paper. Except that the temperature was not very low, the conditions seem to have been nearly as bad as they would be in a North Dakota blizzard. The I. C. C. report of these collisions could very well take the place—for readers who like railroad romance—of a chapter in a novel, though it is all sober fact. A perusal of the report will suggest to the experienced reader the urgency with which, presumably, the men in charge were impelled to disregard Rule 101A, which says that in such severe conditions trains must be sidetracked, and no attempt made to proceed until it is safe to do so.

The importance of absolute blocking is pointed out in the report, though in rather mild language. The main points of censure deal with individual employees' errors or neglect, though the ineffectiveness of flagging is recognized and not much attempt made to assess blame with exactness. The usefulness of an automatic train stop is mentioned in connection with one of the collisions; but in the other two, the trains were moving at very low speed and ostensibly, perhaps, "under control."

The suggestion of the need of absolute blocking refers both to "telegraph blocking," from station to station, and to the use of the automatics as "stop and stay" signals. As the storm blew down several miles of poles and wires, there will be critics to assert that both of these remedies are incomplete. With the automatics the proposal is questionable, even in fair weather, until all signal posts shall have been connected with stations by telephone. "Stop and stay" (at any other place than a station) is a serious matter when a 10 minutes' delay may mean inability to start, and when a flagman's protection may be almost worthless. The suggestion that a railroad ought to maintain wires underground, or should without delay install radio apparatus so as to have manual blocking always available under the worst possible conditions, is also far from being the simple proposition that the theorists would make of it. Four-track railroads with dense traffic are perhaps justified in spending several thousands of dollars a mile for subterranean wires, which may be needed only once a year; and radio communication may be brought within business practicability at some time in the future; but for the railroad which must deal with immediate, everyday problems, both of these expedients are beset with difficulties.

And, for the mountain railroad, in cold climates here is the crux of the problem; it is an everyday problem, yet may not be an urgent problem more than once in five years. The government, however, cannot do less than insist on complete safety. Rule 101A is a reasonable rule. The conductor or engineman or trainmaster who proposes to suspend it takes a grave responsibility. A 30-minute time interval cannot take the place of the space interval. And, as before suggested, a railroad is not required to accomplish the impossible. The situation does, indeed, require a firm will, when to lay up a lot of heavy and important trains may entail great losses while yet there is a possibility that the trains might get through; but a firm will is one of the qualifications for which railroad officers are employed. And it appears from the report that an overruling Will did, after all, stop all trains over Sherman Hill for 30 hours or more; it was by the same means that Napoleon's army in Russia was destroyed—flakes of snow!

How Much Does the Farmer Pay?

THE RAILWAYS continue to be attacked upon various grounds and from various sources. The attacks being made upon them now, which are of the most immediate and serious importance, however, are those being made by public men who represent agricultural states, and especially western agricultural states. These attacks are based mainly upon the ground that freight rates on farm products are too high in proportion to the prices the farmers are receiving for these products—that, in fact, the rates are so high that they are ruining the farming industry.

Now, there is no doubt that directly and indirectly the farmers pay a large part of what the railways receive for transportation service. It has been estimated by the American Farm Bureau Federation that they pay approximately 20 per cent of the country's total annual bill for railroad transportation, or a total of about $1,103,000,000. No reasonable person can dispute the proposition that the cost of railroad transportation plays an important part in farming as well as in every other business, and that railway rates as a whole, and especially the rates that the farmer pays, should not be made any higher than is necessary, in the long run, to enable the railways to provide good and adequate transportation service.

At the present time, however, the attacks being made upon railway rates by those who pretend to or who actually do speak for the farmers are not directed against all the rates charged by the railways. Farmers, like other people, pay passenger rates. But these are not the rates which it is now claimed are ruining the agricultural industry. The farmer also indirectly pays freight rates on a large part of the machinery and other commodities that he buys. But these, again, are not the rates which it is claimed are ruining him. The rates which are the object of attack on the ground that they are so excessive they are making it impossible for farmers to do business at a profit are the rates on the things the farmers themselves produce.

Consideration of the question whether the freight rates on farm products are doing the injury to the agricultural industry claimed may be approached from different angles. For example, we may determine how much higher freight rates and the prices of farm products are now than they were in past periods when it is indisputable that their relationship was such that the farmers could and did do busi-

ness at a profit. The statistics of the United States censuses show that between 1900 and 1910 the total value of all the farms and farm property in the United States doubled, the increase in their value being from $20,000,000,000 to $40,000,000,000. It can hardly be said that the farmers were not prosperous during a decade when the value of all their property doubled. According to the statistics of the United States Bureau of Labor Statistics, the average wholesale price of all farm products is 78 per cent higher than it was during the decade mentioned. According to the statistics of the Interstate Commerce Commission, the average railway rate per ton per mile is now less than 50 per cent higher than during that same decade. Surely these facts indicate that if the farmers of the country are not now enjoying as great prosperity as they did in the years 1900 to 1910 this cannot be due to freight rates, because the increase in freight rates has been much less than the increase in the price of farm products.

Another way to measure the effect that freight rates are having on the business and the profits of the farmers is to determine as nearly as possible how much the farmer is paying in freight rates on his own products as compared with the amount that he is paying for other things. It has been estimated that the farmer pays directly and indirectly about $800,000,000 annually in freight rates. But whether this estimate is or is not approximately correct, it includes an estimate of what he pays in rates on things that are shipped to him as well as an estimate of what he pays for shipping the things that he himself produces. Since the rates that he pays on his own products are the ones that are mainly or almost entirely in question, it is well worth while to inquire how much he actually pays for the transportation of these things. The farmer probably pays freight rates on a smaller part of his total products and on a smaller part of all the things that are consumed by himself and his family than any other producer. Most of the corn grown never leaves the farm, but is fed to live stock where it is produced. Furthermore, a large part of the food consumed upon the farm has been produced there and has had no railroad rates paid on it.

It is impossible to determine exactly how much the farmers pay in freight charges on their own products, but it may be determined approximately. Farm products constituted about 15 per cent of railway freight business in 1921. Statistics for western railways having 85,000 miles of lines which were compiled by the Interstate Commerce Commission and given in the opinion rendered by it in October, 1921, in the case involving rates on grain, grain products and hay, show that the average rate per ton per mile of these railways in the eight months ended April 30, 1921, was 1.38 cents and that the average rate per ton per mile on grain and grain products was 1.1 cents. They also show, however, that the average distance all traffic was hauled was 214 miles while the average distance grain and grain products were hauled was 300 miles. In consequence, the average charge *per ton* for hauling all traffic was $2.96, while the average charge *per ton* for hauling grain and grain products was $3.32. In other words, because grain and grain products were hauled a greater average distance than all traffic, the average total charge per ton for transporting them was 12 per cent higher than the average charge per ton for hauling all traffic, although the average rate per ton per mile on them was over 20 per cent lower than the average rate on all traffic. Grain and grain products constitute about one half of all the farm products handled by the railways, and they are probably hauled as long an average distance as other farm products. Therefore, it is reasonable to conclude that form products as a whole do not at the very outside pay an average charge per ton more than 12 per cent higher than freight traffic as a whole. If this is the case then the total rates paid on farm products in 1921, when they constituted 14.64 per cent of the entire freight business, amounted to $643,500,000. But freight rates on farm products are now at least 12 per cent lower on the average than they were in 1921. On this basis, the present earnings from farm products would be about $556,000,000 a year. This estimate is the highest reasonable estimate that can be made of the total amount being paid for the transportation of farm products on the basis of present rates. The calculation is based on the results of a year which in some respects was abnormal, because, while in 1921 farm products constituted 14.64 per cent of the total tonnage handled, they constituted during the ten years ended with 1921 an average of only 11.16 per cent of the total tonnage handled.

Now, assuming that the farmers do pay approximately $556,000,000 annually for the transportation of their own products, how much would they be benefited by, say, a 25 per cent reduction in their freight rates? A 25 per cent reduction in the rates would amount to about $140,000,000. The average railway rate is at present about 54 per cent higher than it was in 1913. The prices of almost all other things that the farmers buy are relatively higher. The average wholesale price of cloths and clothing is 88 per cent higher than in 1913; of fuel and lighting, 126 per cent higher; of building materials, 83 per cent higher; of house furnishings, 76 per cent higher. The American Farm Bureau Federation has estimated that for machinery, clothing, house furnishings and other commodities the farmers spend about $7,000,000,000 a year. A 2 per cent reduction in the prices of these things, the average price of which is relatively higher than freight rates, would reduce the farmer's expenses as much as a 25 per cent reduction in freight rates on his products. According to the same authority, the farmers pay about $1,000,000,000 annually in interest. Assuming that the average rate paid by them is 7 per cent, a reduction of their average interest rate to 6 per cent would save them $143,000,000 annually, or about the same as a 25 per cent reduction in their freight rates. According to the same authority, they pay approximately $663,000,000 annually in taxes. A reduction of 22 per cent in their taxes would save them more than a 25 per cent reduction in freight rates on their products.

The American Farm Bureau Federation estimated that the total expenditures of the farmers annually amount to $9,784,000,000. Therefore, the freight rates they pay on their own products amount to less than 6 per cent of their total annual expenditures, and a reduction of 25 per cent in freight rates would reduce their expenditures only about 1½ per cent.

The foregoing calculations are, of course, based upon the total income and expenditures of all the farmers of the country, and upon the freight charges made by all the railways. The cost of transportation of their products is relatively a greater part of the expenses of farmers who are located long distances from the large markets than of the expenses of farmers who are located close to the large markets. This always has been and always must be the case. But the attacks being made upon the freight rates on farm products are being made in the supposed interest of all the farmers of the country and against the rates charged on farm products by all the railways. Therefore, the figures given bear directly upon the large question involved.

The figures show clearly that the extent to which the prosperity of the farmers would be increased by a reduction of freight rates are being greatly exaggerated. Any reduction of freight rates on farm products which it is conceivable could now be made without rendering it more difficult and even impossible than it has been within recent years for the railways to render the transportation service that the farmers imperatively need would be of relatively very little benefit to the farmers, while the increasing losses they would sustain because of the increasing shortage of transportation would be relatively very large. There is no class of people in the country which at present is less justified in its own interest in demanding a reduction of freight rates than the farmers.

What Is a Tie?

ALTHOUGH WOOD CROSS-TIES have been an essential element in track construction since the earliest days of railway development, and although they are purchased to the number of more than one hundred million annually, it is only within the last four years that there has been any generally accepted specification or definition of a tie. Prior to 1918 there was no commonly accepted standard. Each road had specifications of its own which fixed the dimensions and other characteristics of the different ties it used. Essential requirements were often omitted, dependence being placed in the producer's ability to judge the quality of wood which would render the purchaser satisfactory service. There was no uniformity of classification or other requirements. Thus a tie which might be accepted as No. 1 by one road might be graded No. 2 by another and rejected by a third.

This created a chaotic condition in the tie producing industry of which some purchasing agents took advantage in times of limited demand and overproduction and which reacted to the serious disadvantage of the roads at other times when the conditions were reversed. During the period of federal control, when the purchase of lumber and ties for all of the railways operated by the government was concentrated in a central agency, it was possible for the first time to prepare and put into general application a specification applicable to all roads and producing areas. The specifications prepared at that time provide for a variety of sizes and of kinds of wood for use, treated and untreated, allowing wide latitude to the purchaser in the selection of the tie best suited to his requirements. Following the termination of federal control, this specification with slight revisions was adopted by the American Railway Engineering Association, representing the users, and by the National Association of Railroad Tie Producers, representing makers of ties.

With this united support of producer and consumer it would seem that any uncertainty as to tie grading would be eliminated and that each would know exactly what was meant by a certain grade. However, this objective has not been realized in full and the success of this development is now being threatened seriously by the tendency of some roads to ignore or to break away from the specifications and to return to their old practices to gain real or fancied temporary advantages of one kind or another, even with the knowledge that this action will inevitably lead to chaos and the abuses of the past.

This tendency is short-sighted and should be arrested. If the present specification is defective in any way it should and can be revised, but it should not be abandoned in its entirety or modified to an extent which will permit the recurrence of the former evils in production and consumption. Even with such shortcomings as it may have, the adoption of the A. R. E. A. tie specification, insofar as it has already been effected, constitutes the greatest advance which has ever been made in bringing the purchase of cross-ties out of the realm of uncertainty into the full light of modern business practice, and the roads as a whole may properly question the motive of any road which substitutes a local specification of its own for the one more widely known and used. Some of this backward tendency would be arrested if maintenance-of-way engineers would call the attention of their purchasing agents to the fact that there is a standard specification for cross-ties which has been adopted by both the Engineering and the Purchases and Stores divisions of the American Railway Association.

Divergence from this standard is usually in the nature of allowance for wane and for lumping dimensions. For example, 6 in. by 8 in. ties will be ordered with the understanding that ties 7 in. wide on top will be accepted provided they are over 7 in. wide in the middle. This tie is recognized in the standard specification as a 6 in. by 7 in. tie, and to call it a 6 in. by 8 in. tie is only trifling with the situation and providing a false basis for a claim by someone that he is paying less for ties of a given size than someone else. Variations of less than one inch in the thickness and width of ties are not practical. The standard specifications assign each size to a definite place as it fails to meet the requirements of a larger size.

By this time the roads which formerly accepted ties 6 in. thick and 6 in. wide, or less, on top should have overcome any reluctance which they may have had to admitting that the bulk of their ties which were formerly specified as 6 in. by 8 in. ties are what is now termed Grade 1. Everybody familiar with the tie industry knows the dimensions of the ties formerly accepted and those accepted, now and no one is misled except the purchaser if he fails to order Grade 1, Grade 2 and Grade 3 ties, apportioned according to his needs.

Modernizing the Water Supply

AS A GENERAL proposition, it may reasonably be asserted that in proportion to its relative importance no department of railway work makes less demands upon either the resources of the company or the attention of the management for its upkeep and operation than the water supply. After the physical equipment required has been installed and set in motion, this department constitutes a refreshing contrast to other branches of work entering as closely into the operation of trains by requiring an unusually small organization and comparatively little material to keep it intact. Such being the case, it seems strange that the water supply of any road should lack the small attention it requires. And yet this condition prevails on too many roads.

The very fact that comparatively little attention is ordinarily required seems to establish the impression with many officers that the water supply can get along with practically none, or at best a disinterested kind of attention that amounts practically to the same thing. Thus, instances in plenty are to be found of pumping installations showing neglect almost beyond belief—instances of antiquated machinery in tumbledown shelters, submerged in grease and other filth; instances of pumps wholly inadequate in capacity and seemingly relying as much on hay wire and rags as upon bolts and packing to keep them intact. Similarly, instances in plenty are to be found of important valves no longer operative by reason of rust or corrosion, installations of steam pumps in places where gas or electricity should be relied upon, of plunger pumps where centrifugal pumps would render far superior service at less expense, of power machinery where gravity supplies are available, of primitive water treating systems where modern equipment would effect greater improvement in less time; instances of flagrant water waste, instances of one treating plant where there should be several or, in some cases, of several where a fewer number better distributed would do. The effect is a needless, inexcusable and expensive waste—waste in material that arises where the little supervision required is not given, waste in money through expenditures which could well be saved, waste in time arising from the demoralizing influence upon men of neglect or inattention by superior officers.

Under such conditions much of the equipment requires more attention than it would if properly designed and some actually constitutes a hazard in appearing to afford protection against emergencies, such as fire, where actually it affords none. A department of railway enterprise which, according to reports of the Interstate Commerce Commission, involves an approximate annual expenditure of $15,000,000 for upkeep and $31,000,000 for operation manifestly should receive closer attention than such instances indicate. What is needed in the majority of cases is modernization in ideas, in equipment, in methods and railway officers should extend themselves to effect it.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Wanted—A Railroad Dictionary

Harvard Square,
CAMBRIDGE, Mass.

TO THE EDITOR:

The time is coming—perhaps is already here—when you will need to get out a general railroad dictionary; not merely a car builders' or a signal engineers' vocabulary, but an all-round book. I notice that you have used (in your editorial of January 27, page 258) the term train dispatcher for the man in France who manages what we Americans would call the transportation feature of freight train work. In England "train control" is used for this or similar work (where one man does it, over a special wire from a central office). Here in America we use "train control" to mean an electro-mechanical apparatus for applying brakes to stop a train, or reduce its speed. Other infelicities of language will occur to any railroad man who recalls what he has read in the last few years. Some man or men, or body of men, ought to be designated as an authority on the subject—why not you?

Railroad men seem to have become infused—poisoned, I call it—with the general modern fashion of bringing out, or attempting to bring out, something new every day. The Interstate Commerce Commission, with its myriad perplexing questions, is one of the prominent offenders in the introduction of jolts into our language. Railroads are now "carriers," night and day and Sunday.

The term "engine" is still used, in conversation, in railroad circles, as of old; but in writing, the dispatcher or train master who dares to use any other word than "power" is bold, indeed. I sometimes read in your paper a whole page about cars and locomotives and never see either of those words; but that beautifully simple Anglo-Saxon term, "equipment," gives me an idea of what you are driving at.

"Traffic," as everyone knows, means one thing in this country and another in England. Aren't Americans and Englishmen sufficiently in sympathy to agree on some uniform practice? This word, however, would be a bad one to begin on, for we use it for a considerable variety of meanings right here at home. A traffic solicitor and a traffic lever have not much in common! Trafficking used to mean buying and selling; but most men in the operating department rarely dare to buy anything; nor have they yet learned your oft-repeated lesson calling on them to sell the railroads to the public.

Another growing fashion that ought to be outlawed when you come to get out your International Railroad Dictionary is the profuse use of parentheses where they are not needed and where, indeed, they confuse the meaning of otherwise simple sentences. The American Railway Association and the Interstate Commerce Commission (aided and abetted by the Government Printing Office) are conspicuous offenders in this respect; also the Official Railway Guide. All these venerated authorities feel free to say, for example, that "There is a relation between (a) and (b)." They know, of course, that, according to the simplest rules of grammar, any reader should have the right to read the sentence *omitting the parts in parentheses;* yet, to do so, leaves him with six words which are utterly meaningless. It looks as though the ghosts of some of the pens that petrified the language of the Standard Code of train rules, in the last century, had come back to earth.

But, to get back to my starting point: just what do you mean by saying that certain French railroads have adopted the American train dispatching system, as our army officers used it? I had supposed that our men in 1917-18 introduced over there actual American train-dispatching: that is, the use of the train-order forms prescribed by the American Railway Association—Forms A, B, C, E, G, H, J, L, and the others. These are the forms which give right to road. Without such orders an extra cannot enter the main track. Disregard of such orders leads to collisions. The train dispatcher, controlling the issuance of these orders, becomes the one czar and author of train safety. Your article seems to indicate that the Frenchmen have only adopted the methods which our dispatchers use *when they are not dispatching.* Is that the case? Of course, the train dispatcher is the man who tells the local freight conductor to go into Smith's coal yard and get out an empty car; but that is not train dispatching.

J. J. J.

Giving Interviews to the Newspapers

PHOENIX, Ariz.

TO THE EDITOR:

Your editorial, "Railways and Public Opinion in the New Year," on page five in the issue of January 6, gives the "meat" of the present situation.

Only yesterday the writer met a reporter of one of the daily papers. His remarks were to the effect that the railroads never gave out any news. Officials were abused and criticised, but they continued to calmly ride around in private cars and smoke good cigars. The only opinions given were infrequent signed statements sent to the newspapers at the convenience and leisure of the railroad officers. This is one expression in a small community, but it seems to be a general opinion and a serious menace to private ownership. Such examples show the value and necessity of the railroads making a united effort to increase public knowledge and improve public sentiment regarding railway matters.

I do not wish to be placed in the position of seeming to criticise the railway officials. The attitude of the officials is partly the fault of newspaper managements in sending young cub reporters, oftentimes unshaved, to interview busy railroad officers. Such representatives of newspapers do not inspire a railroad official with any confidence that his remarks will be handled well, or that the newspapers are particularly interested in securing information.

A newspaper sends out its reporter to secure news and it is valuable to its business to secure news copy, or a scoop, just as it is for a salesman to secure an order, or a freight solicitor to secure routing. This is oftentimes not realized or understood by officials.

RUSSELL P. KYLE.

Advantages of Platform End-Sills

HARRISBURG, Pa.

TO THE EDITOR:

There is at present considerable discussion on the merits of standardized railway equipment, particularly as to freight cars. At the same time new cars are appearing in considerable numbers with one particular departure from established designs which seems to the writer of sufficient importance to warrant more general attention. Reference is made to the absence of outside or platform end-sills on many of the new types, particularly box cars and refrigerators. From the

standpoint of safety alone, a car built without platform end-sills, in the writer's opinion, is just as faulty as one without sill-steps or grab-irons. The designers apparently fail to realize that it is frequently necessary in switching cars, and otherwise handling trains, for trainmen to pass from one side of a car to the other. The train may be nearing a bridge, tunnel or other overhead obstruction, so that the only way left to get from one side to the other of these cars is by stepping on the couplers. Even if the train were standing with no obstruction near, how many men could be expected to climb over the car? The other alternatives presented are crawling under the car or via the couplers.

In yard and station work this movement of members of the crew from one side of the cars to the other is apt to be frequent during a single tour of duty. The more cars there are without platform end-sills the more often will cases, such as mentioned above, arise wherein the trainman's desire to work safely will interfere with his efficiency. The difference between the time required to get from one side of a car to the other by using end-sills and by crawling over the top may be the difference between stopping short of a switch wrongly set, and running through it. As a matter both of safety and efficiency a car should have platform end-sills.

HERBERT ASHTON.

Problems of the Car Service Agent

BROOKFIELD, MO.

TO THE EDITOR:

I have just read, on page 243 of the *Railway Age* of January 20, about the appointment by the American Railway Association of district managers to establish and maintain a closer and local relationship with railroad officers, to the end that car distribution may meet most effectually the demands of commerce, etc.

New ideas and constructive criticism are, indeed, needed; and I want to ask, in a friendly way, what good the Car Service Division can expect out of this new organization, with the instructions as outlined. I know that I voice the opinions of a great many practical transportation men when I say that, as now constituted and organized, the Car Service Division and its inspectors constitute a meddlesome body who do not accomplish any really productive results; but, on the contrary, cause all railroads a lot of unnecessary work in the way of correspondence and complicated, useless reports which do nobody any good.

I spent several months in New York checking the loading of freight at the various piers, freight houses and yards; also the yards in Buffalo, Chicago and other places, getting information about violations of car service rules. I made my reports to the Division headquarters and they in turn wrote to the various roads; but all this lot of correspondence passed without any good coming from it. The operations served merely to fill space, so to speak, and to give someone a job.

The railroad men of today, on the firing line, consider a traveling car agent as only a necessary evil. He digs up a lot of dead matter, but in many cases he is not experienced in the actualities of transportation, and so his accomplishments have little weight.

A road foreman gets up on the engine and shows the engineer how to handle the air and the throttle.

The train rule examiner shows the dispatcher how to make a better meeting point; and shows the operator where a clearance card is improperly made out, etc.

The I. C. C. inspector ties up the defective locomotive.

The car inspector marks "out" the bad order car.

The traveling auditor finds the leaks and corrects them.

All these do constructive work and promote efficiency; why should not the expensive organization of the Car Service Division do likewise?

The rules of the operating department fill a book of several hundred pages, yet all of the material can be summed up in one sentence: To prevent one train from running into another. The condensed meaning is "Use common sense." If we can use this formula in the car service much good can be accomplished.

Boiled down, car service rules aim simply to get cars home, where they belong. The literal application of the rules would, however, cause great confusion (and I sincerely believe that all railroad men try to live up to them) and so, to avoid loss of business, congestion, back and cross hauls, switching, and so on they are violated all the time; and these violations *are for the good of the public.*

I would suggest that we cut out all this nonsense about getting in touch with officers' organizations or shippers' organizations, discontinue these useless reports and checks, and get down to practical railroading.

(1) Examine the car service agent or district manager, not as to what he knows about the car service rules, as anybody can learn these in ten minutes, but about what he knows about the railroad he is going to check; about the "Equipment Register"; the difference between a sugar car and a grain car; what kind of a car goes next ahead of the way-car and what kind goes behind.

(2) How cars are distributed, as between railroads; how between districts; between divisions, between stations and between shippers; and how this distribution is performed and why. Who distributes the cars and what qualifications he must have. If car service rules are causing cross and back hauls, ask him how to remedy the trouble. The power situation and how it affects distribution and movement is an essential subject; whether through trains with tonnage, or light locals, do the distribution; whether these trains are properly grouped. There will be found great differences of conditions, and savings can be made.

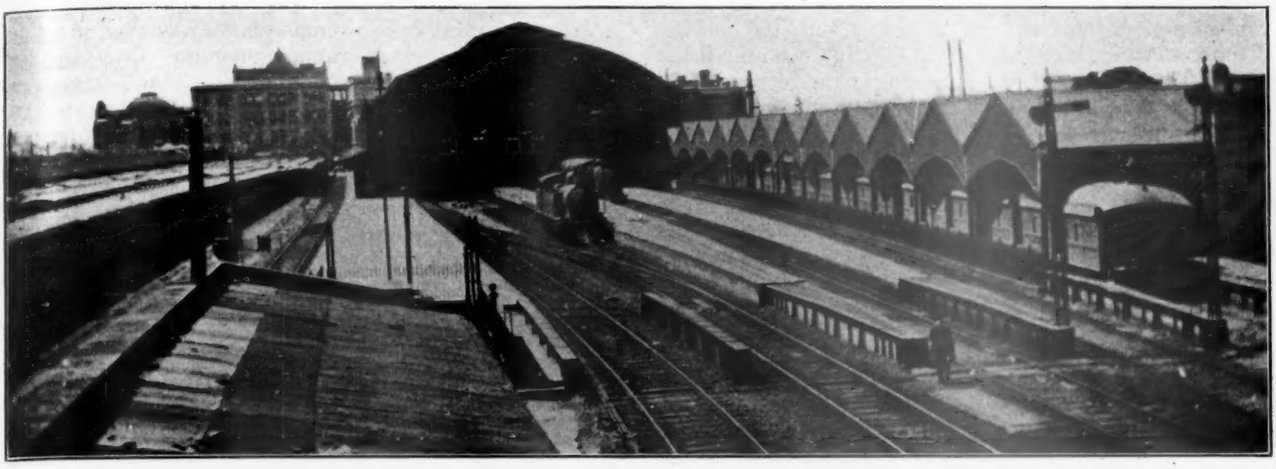
Ask about the ordering and furnishing of cars at terminals, both on home rails and for return loading; see if connections are passing cars back and forth simply to get rid of them. Do transfer engines handle their full capacity? Do connections return cars as ordered?

Congestions cannot be relieved by any outside agency. A congestion may be caused by shortage of power, in which case more power is the remedy; or by a derailment, in which case it will clear itself when the track is cleared. If caused by too much business the up-to-date transportation officer will route cars over other divisions to relieve the congested ones.

The distribution of engines and cars is usually controlled by not more than one or two, possibly three men, and they hold the key to the situation. If car service agents will confer with these men and help them in the chief dispatcher's office they can accomplish something that will be of real assistance.

I wish it were possible for the *Railway Age* to reach all employees instead of only the officers. It certainly contains much useful educational information that would improve the service of individuals. It would do more good to the railroads at large than any such inspection as that now prescribed. Employees have only their magazines issued by their brotherhoods, and these are mostly fraternal. Many a railroad man is craving new ideas and desires to better himself and give better service; and a really instructive magazine put into these men's hands would meet a long felt—or at least a long existing—need. Let any superintendent or general freight agent look over the recent Annual Review Number, with its 168 pages of instructive matter, and see if he does not find many articles which he would be glad to have his men read.

H. P. DREYER.



Once Passenger Terminal, Buenos Aires

Railway Operating Methods in Argentina

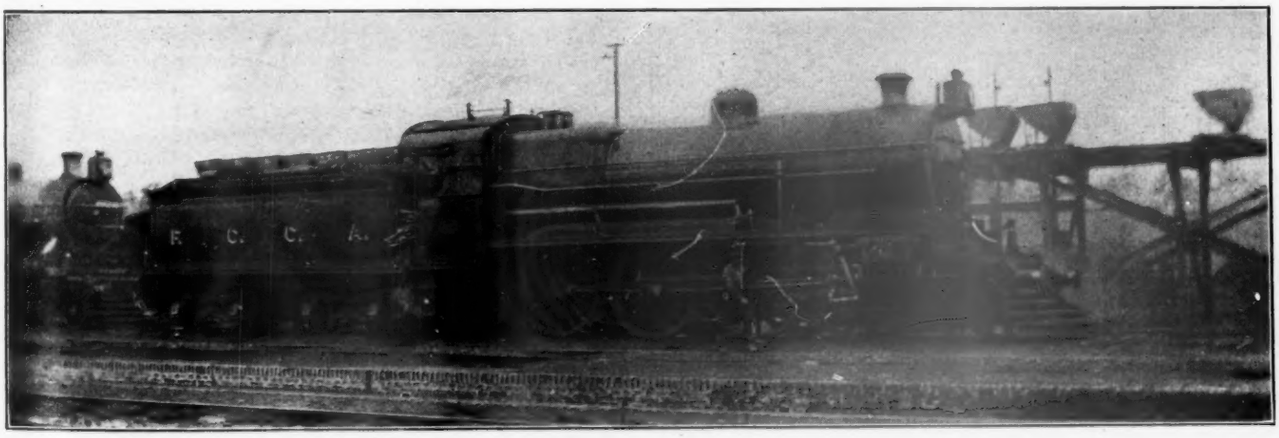
All Trains Scheduled—Empty Movement Heavy—Restrictive Working Conditions

By Herbert Ashton

THE RAILROADS IN South America, of which those in Argentine are most easily comparable to the railroads here, are, as is well known in great part, English owned, and in large measure operated after English methods.

The organization of the Argentine railways is in general similar to those of England, i. e. departmental. The executive head on the ground is the general manager. In the central offices under him are the heads of the various departments: treasury, traffic (the English term for operation), mechanical, auditing, maintenance of way, and commercial (corresponding to our traffic department).

Thus the chief operating officer is the "gefe de trafico," who may have assistants in charge of freight and passenger traffic respectively, but who is directly responsible for the efficient operation of the trains. Under him is his "train control" organization which performs the functions of our movement bureaus and train dispatchers combined. The train control organization is headed by picked men from the mechanical and traffic departments, who constitute the central train control bureau, and whose duty is to plan the movement on the basis of reports received by wire from the various yards and stations, at the end of each day's work. Co-operating with the central train control bureau is the movement bureau, which controls the distribution of empties according to the orders received from the shippers and which, by government mandate, must be filled in the order received. These orders are transmitted to the different sections concerned which are responsible for the actual placement.



Locomotive for Through Passenger Service—Coal Tipple in Background

The Traffic Inspector

The Argentine railways are divided into sections, each section having local representatives of the mechanical, maintenance and traffic departments respectively. The representative of the traffic department is called a traffic inspector. It is the duty of the sectional traffic inspector to supervise the movement of traffic through his section. In this connection he is required to know thoroughly the nature and amount of traffic originating in his territory. In the case of grain

for example, he must make a close estimate of the size of the crops of each planter, and the time they will start moving. Monthly statements are also made covering conditions currently. The examination of all claims is handled through the office of the traffic inspector in whose territory they originate, as well as the ordinary cases of discipline and the investigation of accidents, which is made jointly with the local representatives of the other departments. With the growth of the railways this has proved to be a weak point in the organization, as so much time must be given by the traffic inspectors to the estimation of the crops and handling of claims that too little opportunity is left for the supervision of the actual movement of traffic. This must often be left to the station masters and section control chiefs, with a consequent lack of co-ordination between the sections. This condition has led to the formation of the central train control organization mentioned above. With a further increase in the volume of traffic indications point to an extension of the work of the commercial department to cover the investigation of claims, thus relieving the traffic inspectors of a burden which is not directly connected with their regular duties as operating officers.

Reporting to the traffic inspector are his yard chiefs and station masters, whose duties correspond to those of our station agents. In the train control organization are the section chiefs, who direct the movement of the trains, and the cabin operators, who perform the same duties as in this country.

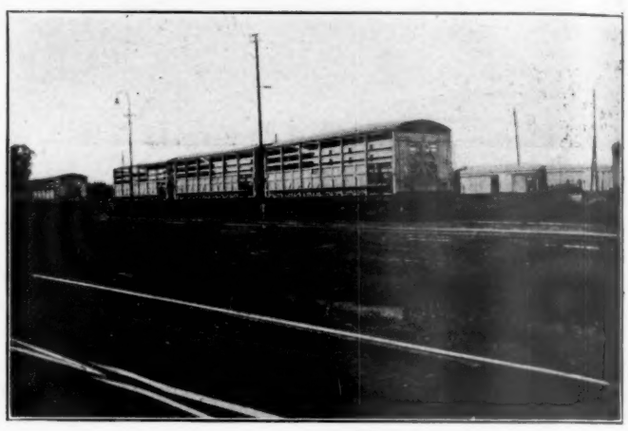
Freight and Passenger Cars

The equipment is of English make. The passenger coaches are constructed after the manner of our own, are of wood, and have no heating facilities. Both electricity and gas are used for lighting. Many of the coaches do not have vestibule doors, and none are equipped with automatic couplers. They have hand-brakes and the English vacuum brake.

The freight equipment is quite varied, ranging in capacity from 10 tons to 50 tons. The 10-ton "wagons" have only

Wood-Burning Yard Engine

2 axles. There is no air brake or other automatic brake on freight equipment except the cattle cars, which are fitted with the vacuum brake carried on passenger cars, since frequently individual consignments of cattle are moved by passenger trains. The cattle "wagons" are equipped with end-doors instead of side-doors, as in this country. These doors consist of three parts, two vertical pieces which swing outward on each side forming the walls for the space between the cars, and a bottom gate which forms the floor. A series of iron bars inside can be lowered to protect the door when the car is loaded. Although two doors have thus to be opened per car when loading or unloading, considerable economy in room is effected, since an entire train can be loaded or emptied from a single platform at the end of the track, by driving the cattle through the train. On a considerable proportion of the equipment the hand-brakes are operated from the ground, and since many of the cars have no sill-steps or grab-irons, hump-riding is practically impossible. The Western Railway probably has the best freight equipment. This road has a large number of 50-ton all-steel cars of the box and gondola types. The "closed wagons" have an arched galvanized iron roof. Because of the type of coupling, which consists of a hook and link combination, and the absence of any automatic braking apparatus, the



Cattle Cars for End Loading

Showing Make-Up of End-Door, Consisting of Two Vertical Parts Which Swing Outward Forming Sides and a Drop-End Piece Which Forms the Flooring Between the Cars

light-weight of the 50-ton cars amounts to only 15 tons. The gondola cars are divided into two classes, the all-steel, high-side cars, which are used for transporting coal and grain, as noted below, and the low-side cars which have "drop-sides" as well as drop-ends and can thus be used as flat cars. It is the intention of the management of the Western Railway to reduce the number of types of equipment in this manner as far as possible. The general types in use at present are the gondola, flat and box. There are also the cattle and sheep cars and a few tanks for handling railroad fuel. There are a limited number of especially designed hoppers for hauling ballast, but the demand for this type of equipment is almost nil. There are no refrigerator cars properly so-called. The cars that go under the name of "frigorificos" are double-lined box cars in which the ice is placed on the floor.

The Handling of Locomotives

The locomotives are both simple and compound. The fuel prior to the English coal strike was wood or coal. During and since the strike, oil has been instituted, and though no figures could be obtained as to its relative efficiency, indications pointed to a continuance of its use. All locomotives are equipped with two water gages and a steam brake. The injector is an English non-lift type. Locomotives are not pooled as in this country and in consequence are better taken care of by the crews. Sometimes two crews are assigned to an engine and in some cases three, but the policy is not to exceed this as a maximum. The normal time in the engine house is from six to twelve hours. Yard engines as well as road engines are equipped with pilots, and have no foot boards or other devices for carrying the crew.

Outbound Movement Largely Empty

Since the main volume of traffic (over 75 per cent of the total) moves from the interior of the country towards the

city of Buenos Aires, a large proportion of the reverse movement is empty. The incoming traffic consists chiefly of grain and cattle, with some hides, wool and hay, and a few other commodities of less importance. The traffic to the interior from Buenos Aires consists mainly of general merchandise and agricultural implements. The merchandise requires closed cars, whereas most of the grain is shipped in open "wagons" with canvas coverings, the cattle being handled in the regular kind of equipment for this class of freight. The open-tops are used for grain loading as allowing of quicker loading as well as a better average load than the closed cars. Hides are shipped in the closed "wagons," used for hauling the merchandise from Buenos Aires. There is, therefore, a regular empty movement of cattle cars and open-tops from Buenos Aires to the interior. All of these empties cannot be dispatched in solid trains, since the traffic is offered in small amounts at points all along the line, so that the required number of empties of the proper class are put in trains together with loads for the various stations. This makes the classification work complex, and requires very close co-operation between the train control and movement bureau in arranging the work and composition of the trains.

All Freight Trains Are Scheduled

Freight trains as well as passenger trains are regular and have a time table number and schedule. The numbers are arranged in series to designate the different classes of trains. The time table also provides for additional "special" trains to be run as traffic conditions demand according to the "path" system, which means that these specials are run just as regular trains, on a prearranged schedule or path, fitted into the regular movement so as to provide against bad meeting and passing points with consequent delays, and is an exceedingly important factor in the operation by reason of the amount of single track. In this connection the sectional train control staff is required to plot the movement of the various trains through their respective sections each day on forms especially prepared for this purpose. These performance sheets are forwarded to the central office each day where they are examined carefully and criticized. It was thus possible during the writer's visit on one of the roads to attain an average speed in freight service for one month of over 30 kilometers (18.6 miles) per hour. Two factors assisting in this accomplishment were the absence of heavy grades, the country being practically a level plain, and the fact that a considerable proportion of the traffic on this road was live stock, i.e., not tonnage freight.

Before each train leaves the yard the guard and engineman receive copies of the work order showing the points at which cars are to be picked up or set out. The guard takes the waybills and makes a wheel report covering the trip. This report is checked against the waybills at the end of the trip and compared with a check of the train made as soon as it enters the yard by a checker. The road engine is then detached from the train by a member of the yard force. Where freight is picked up or set out, the movements of the locomotive necessary in doing the work must be made by the yard or station force at the point. The guard simply checks his train at the beginning of the run, for which he is allowed forty-five minutes, makes his wheel report and takes charge of the waybills. The block systems are manual and controlled manual, and in most cases absolute block operation prevails. The train staff system is generally used but the practice of operating by train orders is spreading.

Yard Organization and Operation

The yard organization is not widely different from this country. The whole yard is under the supervision of a "gefe," who has assistants in charge of their respective portions of the work. These assistants have supervision over one or more crews, which are composed usually of three men, though in some instances only two. All classification work is done by switching lists. When a train enters the yard the guard delivers the waybills to the man in charge, who checks them with the wheel report made by the guard covering his trip, which is in turn compared with a check made of the train by a checker, as noted above. The checker's list is then used by the yard crew as a cutting list in switching the train.

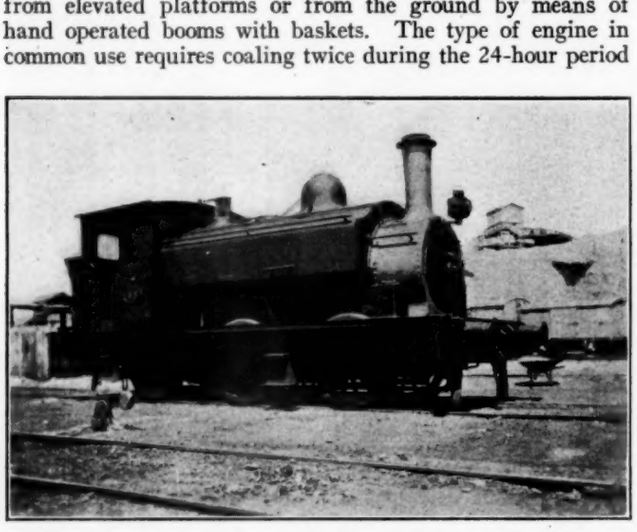
A "Goods" Yard, Retiro Station, Buenos Aires

All the yards are flat yards, with the main tracks running through the center in the majority of cases, dividing the yards into two distinct parts. In a number of the older yards the tracks are dead ended. In spite of these apparent deficiencies, however, a very good performance is made in the number of cars handled, the highest figure on record being 377 cars in ten hours by a single crew. This was a special case of long cuts; but the writer has seen as many as 193 cars handled in eight hours of ordinary switching.

The arrangement of all movement by time table makes for precision in the yard work as well by permitting close

regulation of the different phases of the work, so as to utilize the yard power to the best advantage and avoid interference. At a given hour a certain train must be ready. Points at which this train does work are known by time table so that the freight for these points can be put promptly into the required order. The number of cars which will go into the train is determined by the type of engine available and certain labor regulations mentioned below. The absence of air brakes also removes one of the chief causes of delay in getting trains out of the yards. A comparison made between a number of the yards visited as to the relation of the amount of yard power used to the total number of cars passing through the yard showed a maximum for the 24-hour period of 26 cars passing per yard engine hour including cattle trains. The largest figure exclusive of cattle trains was 20 cars per yard engine hour. Similar data taken for several flat yards in this country gave a maximum figure of 46 cars passing per yard engine hour. This difference in performance is due chiefly to special local conditions but partly to the difference in method of receiving freight into the yards. In Argentine the general practice is to deposit all trains on the receiving tracks, from which they are moved by yard power to the classification "grids" and arranged for dispatching; whereas, it is common in this country in flat yard operation to deliver the cars by road power directly to the classification tracks. Moreover, a considerable amount of yard work is often saved by cutting the trains in putting them away in such a manner as to bring together the cars of the same classification.

In many of the yards engines are coaled by hand, either from elevated platforms or from the ground by means of hand operated booms with baskets. The type of engine in common use requires coaling twice during the 24-hour period



Saddle Tank Yard Engine with Sand Box on Running Board

and the total time thus lost per day amounts to approximately one hour and thirty minutes.

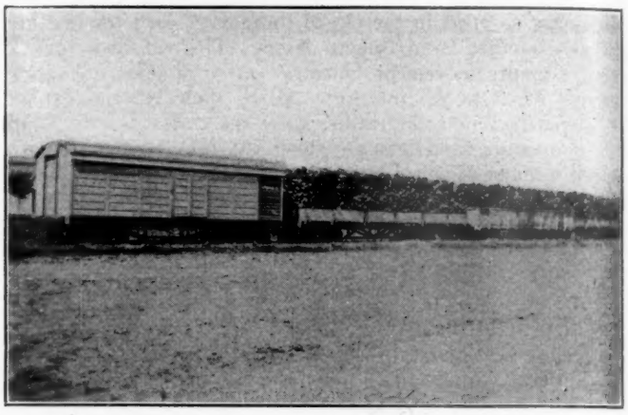
The handling of cars in the yards in Argentine is in general more gentle than with us. In a few instances, where the impact between cars was severe much of the shock was very effectively absorbed by the car bumpers. There were no cases observed of damage to equipment as the result of rough handling.

There are no yard records kept as in this country. Copies of the guards' wheel reports for trains arriving and departing are sent to the central record office. A check of all trains entering and departing is entered in yard record books with the date, engine number, train number, name of guard and time of arrival or departure. But these records are kept independently as to directions. No attempt is made to record the individual car movement through the yards.

City deliveries are made from the concentration points on the outskirts by means of trip runs to the various city terminals, which operate on a pre-arranged schedule so as to secure regular prompt deliveries as well as the maximum use of the engines assigned to this service.

Labor Conditions

The labor regulations constitute probably the most important factor bearing on the operation of the railroads in Argentine. Seniority operates in much the same manner as



Fifty-Ton All-Steel Box Car and Gondolas Loaded with Fuel Wood

in this country and in taking on men as the volume of business increases preference must be given to ex-employees who may have been dropped during a previous depression. A great deal of time and effort is often required to get in touch with these men, who when approached are quite apt to demand a guarantee of permanent employment. All employees in engine and train service are paid by the month. This means that as long as traffic conditions warrant holding a man on the payroll he must be paid a full month's wages even though he may do only a few days' actual work. The work of the regular runs is "diagramed" so as to provide the regular rest periods after each trip; and the crew is not required to perform any work not specified on the "diagram" or assignment. In addition one rest period of thirty-two consecutive hours must be allowed a week. The difficulty in securing temporary labor has necessitated maintaining a large permanent staff to provide against fluctuations in business.

To offset some of these difficulties, however, a train of 30 cars or less (120 axles) can be dispatched with only one guard, as opposed to the minimum of three in this country. Thus two guards are sufficient for all ordinary trains. Engines assigned to drag service can be used also for switching in yards without additional compensation.

The labor regulations in South America require a more stereotyped system of train movement to provide for the regular rest periods required by law; and the nature of the traffic in Argentine, which is agricultural, more or less regular in its movement, and whose volume can be closely estimated in advance, is adapted to scheduling.

The managements of the railroads in Argentine are decidedly on the alert in hunting for improvements in operating methods. It is felt that traffic conditions resemble those in this country in some respects more than they do conditions in England, and American methods are carefully studied in this connection. On the Western Railway the Railway Gazette (London) and the *Railway Age* constitute prescribed reading for the sectional traffic inspectors and suggestions of possible improvements as the result of such reading are encouraged.

Security Owners' Car Pooling Plan Analyzed

Special Committee of A. R. A. Finds Proposal Unsound, Impracticable and Based on Many False Premises

WASHINGTON, D. C.

THE PLAN for the financing, pooling and central repair of freight car equipment proposed by the Board of Economics and Engineering of the National Association of Owners of Railroad Securities, is "economically unsound, impracticable of application, is not in the best interests of the shipping public, and is contrary to the fundamental principles of private and competitive operation of the American railroads," according to a comprehensive report filed by the American Railway Association with the Interstate Commerce Commission. Copies also were filed with the House and Senate interstate commerce committees.

The report takes up item by item the economies claimed for the plan by its proponents and by careful analysis undertakes to demonstrate that these claims are not justified and would not be realized if the plan was put into effect.

The report was prepared after an extensive study by the special committee. J. E. Roberts, superintendent of transportation of the Delaware & Hudson, was chairman. The report was also reviewed and approved by the general committees of the Mechanical and Transportation divisions and by the board of directors of the A. R. A.

In laying the proposition before the special committee, R. H. Aishton, president of the American Railway Association, instructed it to go into the matter with an open mind, adding, "there should be no feeling of hesitation on the part of the committee or its members, if a suggestion has merit, in making a recommendation to that effect in order that, even if a part of the plan would be of advantage, the railways may have a chance to have all the facts in connection with it and the reasons why, in the judgment of the committee, it would be advisable in order that they may put it into effect."

Under the plan as presented to the Interstate Commerce Commission by W. W. Colpitts of the Board of Economics and Engineering, an agency to be known as the National Railway Service Corporation would be formed under federal charter which would take general charge over freight equipment subject to the pool operations, its repair and the construction of new cars for the purpose of bringing about "the unification of freight car control."

Conclusions of the Committee

The conclusions of the committee are summarized as follows:

That the plan proposed by the Board of Economics and Engineering of the National Association of Owners of Railroad Securities is economically unsound, impractical of application, is diametrically opposed to rendering efficient service in the best interests of the shipping public, and is contrary to the fundamental principles of private and competitive operation of the American railroads.

That its adoption would increase rather than decrease operating expenses with a resultant increase in charges against the public.

That the agency proposed would not be answerable for operating results of any single railroad, even though that railroad be subjected to its mandates.

Paramount in importance is the fact that so-called "car shortage" may not, in reality, represent a shortage alone in the number or capacity of cars owned by the railroads but occurs as well because of labor interruptions in both railroad and industrial service, and sudden changes in market and other economic conditions, creating an extraordinary demand upon all railroad facilities which no reasonable supply of facilities can be expected immediately to meet. Shortage of other kinds of railway facilities such as second main tracks, yard and passing tracks, locomotives, etc., develops at such times and adds to the difficulties resulting from temporary car shortages. The so-called plan does not furnish a cure for this.

Machinery is now available to meet any emergency which may arise in regard to car service, better than under the plan proposed. The railroads have voluntarily subordinated themselves to their own Car Service Division, working in close co-operation with the Interstate Commerce Commission, which has full supervisory powers under the Transportation Act, and the way is clear to handle cars by the most effective methods.

The possibilities for improvement in the various features referred to by the Board lie largely in directions other than its report suggests. Primarily, there should exist such an attitude toward the railroads as will convince the public that money invested in railroads will receive a fair return, thereby strengthening railroad credit and making it possible to increase railroad facilities so as to care for the growing transportation needs of the country. This can only be done by the investment of additional capital, which can be secured only by the reasonable assurance of a fair return, and this assurance will not exist unless the investing public has reason to expect from the government a liberal, stable, and not a repressive attitude.

Without such assurance the investing public will be reluctant to furnish additional capital needed for extensions and added facilities commensurate with growing traffic, and no agency or intermediary will be able either to overcome such reluctance on the part of the investor, nor on the other hand be able through its intervention to make the securities more attractive and reduce the usual financing cost and the rate of interest.

Adequate railroad credit will not only furnish adequate facilities, but will also enable the railways to utilize all their facilities to best advantage and further to increase their operating efficiency. The past history of the railroads has clearly demonstrated their ability to surmount difficulties which at the time seemed serious and great, and with fair treatment they will continue to do so and meet all reasonable transportation demands which the public may make.

Attention is called to the latest annual report of the Secretary of Commerce, in which Mr. Hoover makes the following statements as to the efficiency of railway operation and the restrictive character of railway regulation:

"The management of our principal railways today, by all the tests of administration, of load factors, of mechanical efficiency, etc., is the most efficient transportation machine in the world insofar as it is not limited by causes beyond the managers' control. We must have increased transportation, if we are to maintain our growing productivity. We must, therefore, find a way out of the cycle of systematic starvation of a large part of our mileage and the denudation of our railroad managers of their responsibilities and initiative."

The railroads are not opposed to standardization of car design. In fact, they are in favor of it and have been practicing it consistently. The records of the Master Car Builders' Association and the American Railway Association bear witness to this fact.

It must not be overlooked that the railroad transportation machine is so hampered by restrictive governmental regulation that it cannot be hoped to obtain from it, for the public, the highest usefulness and efficiency. Certainly nothing beneficial to the public can be accomplished by an increase and tightening up of these restrictions and a further limiting of the power of individual initiative and enterprise, through the establishment of another superagency over the existing managements such as is involved in the proposed pooling plan.

In any event, the present Transportation Act, adopting and continuing the powers as to the distribution of cars put into the law by the Esch bill of 1917, and adding others as to coal cars, provides for central control of all cars in time of emergency. The final power to deal with the subject is therefore now by act of Congress conferred upon the Interstate Commerce Commission. In fact, acting under such Congressional authority, the Interstate Commerce Commission has already before it the question of the adequacy of transportation, including the adequacy and distribution of car supply, and the railroads will be prepared at the proper time to substantiate their conclusions by competent testimony.

General Discussion

The general discussion of the proposed plan is as follows:

1. In discussing the plan, it is well to analyze the premise upon which it is predicated, for if its basis is fundamentally unsound and contradictory to the very principles upon which our transportation systems have been builded, it follows that the benefits claimed for its detailed processes are mere conjectures.

2. Introductory to a discussion of what the plan contemplates, it is stated that the problems confronting the carriers have been

viewed "as those of a single great transportation system." Generalizing in our transportation problems of national scope is not an original thought, but has been constantly maintained by the railroads for many years, as far as has been found practicable. However, it should be pointed out that from the viewpoint of an individual railroad or an individual shipper located on that railroad, its problems and their relationship to that shipper can not and should not always be treated from a national viewpoint, if the most satisfactory transportation service is to be rendered. In fact, it is a wide-spread opinion at the present time that centralization in the operation of the railroads is diametrically opposed to the best interests of the majority of the shipping public, and that decentralized effort, and closer observation of local needs and conditions, is a pre-requisite to efficient transportation service.

3. Contrary to the view expressed in the introduction of the plan that the nationalized "viewpoint must be sustained and the economies introduced that common interest dictates if private ownership and operation are to survive," is the practical application of such a theory to the ultimate outcome of private and competitive operation. To place an agency not answerable for operating results of any single railroad in control of equipment, shops, and repair facilities, would separate the main railroad structure from local operation, would divorce the individual railroad from control over the principal instrument which it possesses for earning its livelihood, and would prevent the free play of competition between territories and shippers.

4. It is claimed in the report that "the income of the railroads is now and has been for years, quite insufficient for their needs, and, were the properties now being maintained so the business of the country could be properly handled upon the return of normal conditions, their income would suffer shrinkage to the point of bankrupting many important lines."

The inaccuracy of such a statement is definitely set out by the actual performance of the railroads during the Fall of 1922, when under abnormal economic conditions the railroads actually moved more carloads of freight than in any corresponding period in their history in spite of the shop strike, and the disarrangements caused by the coal miners' strike.

5. If railroad revenues are "insufficient" at the present time, this is due to the cumulative restrictions of laws, aggravated by the economic and political dislocations caused by the World War, together with the return of the properties to their owners with a disproportionate relationship between expenses of operation and revenues therefrom, a period from which industry generally, as well as the railroads, have not yet fully recovered. There is nothing in a plan that calls for "centralization" which furnishes a panacea for this condition. If railroad revenues are not sufficient to permit the expansion of our transportation systems to meet the growth of agriculture and industry, the causes therefor are more fundamental and basic than are represented by the remedies which the plan proposes. They may be more properly charged to restrictions in the application of economic law to the railroad business, which this plan is likely to accentuate rather than minimize.

6. It is further stated that "limitations inherent in individual operation" render impossible satisfactory service to the public. Surely this statement is in direct conflict with the previous avowed intent of the plan to preserve private ownership and operation. It constitutes an admission on the part of the framers of this proposal that the "limitations" claimed, which are in fact the very elements of private initiative and competition, are to be dispensed with.

7. The railroads can subscribe to the fullest extent to the statement "that at no time in this history of the railroads has the need been so great for instituting every possible economy in operation."

But the proponents of the plan are apparently unfamiliar with the fact that the advantages claimed for it have already been largely obtained, or are being obtained, without the cumbersome intervention of an expensive agency having no financial responsibility for results.

The railroads, through the Car Service Division of the American Railway Association, have set up machinery which can fully take advantage of the benefits to be derived from centralized control, without interfering with necessary localized effort or restricting the free application of the competitive practices of the railroads, so necessary to perpetuate efficient operation and service.

8. The basis of the plan entirely disregards the rights of shippers who have developed their business upon the lines of particular railroads which provide equipment especially adapted for their traffic; the grain road has provided cars which will carry grain and flour; the coal road, such types of cars as require return to the owning lines; the steel road, so-called "mill" types of open-top cars especially suited for concentrated loads; railroads serving automobile and furniture industries have provided special types of closed cars for this traffic; several types of refrigerator cars are confined to specific railroads and territories dependent upon the class of traffic originated and for the best interests of the shippers —all suited to the particular needs of the patrons served.

9. The plan contemplates the setting up of a large and expensive organization duplicating many of the facilities and operations now conducted by individual railroads, yet it does not propose to eliminate any of the existing machinery.

10. It is contrary to the history and experience of the past to say that "the properties cannot be adequately maintained and satisfactory service rendered the public under the existing conditions." It is true that the transportation shortage of the immediate past has probably been the most severe in the experience of the roads, but the conditions which are primarily responsible therefor have also been most unusual, and beyond the immediate control of the railroads. The causes of the conditions lie much deeper than seem to be assumed in the plan, which does not point the way toward a cure of the fundamental troubles affecting the railroads, many of which are a legacy of the war period, and also the cumulative effect of the restrictive legislation of the past 20 years. They cannot be cured or readjusted by a proposal to inaugurate some theoretical and unproven plan of relief, unsupported by definite or conclusive data.

11. Because of the severe business depression following the termination of government control, it was not possible quickly and fully to repair the railroad plant, as it would have been under more favorable conditions. This condition at the period of peak business, combined with the effects of labor disturbances, made it impossible for the roads satisfactorily to perform the extraordinary task of making up for lost time in carrying the coal tonnage, held back by the miners' long strike, further aggravated by an unusually sudden revival of business in general. Notwithstanding all these cumulative obstacles, the railroads have during this trying period rendered a transportation service never equaled within the same period of time.

12. Under present methods, there is an incentive to build cars for the traffic requirements of the territory served by car owners. Such incentive would be removed under car pooling, as railroads owning the car would have less assurance of the use of equipment provided by them. As an indication of this, practically every locomotive and car repair shop at the end of 1922 was working practically to capacity. Orders for new equipment, placed under individual initiative in 1922, were unusually heavy. The records indicate that there was installed during that year a total of 77,221 freight cars, and the railroads had on order as of January 1, 1923, 68,332 freight cars, making a total of 145,553 cars ordered and installed during the year 1922, which is the heaviest for any year since 1916. During the year 1922, 1,379 locomotives were installed and there were 1,445 on order on January 1, 1923, making a total of 2,824 locomotives installed and on order during the year, which is the largest since 1916. No centralized operation could improve materially, if at all, on this situation.

Estimates of Annual Savings Not Justified

It was claimed in the Report of the Board of Economics and Engineering of the National Association of Owners of Railroad Securities that: "Savings in railroad operation can be effected aggregating more than $300,000,000 per annum, an amount equal to about one-third of the $911,000,000 paid in 1920 in interest and dividends to the owners of the bonds and stocks of Class I railroads." The savings claimed are made up as follows:

1. Reduction of empty car mileage	$ 9,000,000
2. Reduction in first cost of new equipment	33,000,000
3. Saving in financing the purchase of new equipment	23,000,000
4. Reduction in cost of freight car repairs	30,000,000
5. Saving through retirement of "weak" cars	96,000,000
6. Saving through improved distribution of cars	66,000,000
Total	$257,000,000

The remainder of the $300,000,000 was not specifically accounted for.

The committee analyzes the claims as to each of these items of estimated saving. Some of its comments under the various headings are as follows:

Reduction of Empty Car Mileage

This clearly shows a misunderstanding of existing car service rules. It fails to recognize the principle of direct connection ownership, and also makes no mention of the authority of the Car Service Division of the American Railway Association as granted by the car service rules (per diem rule 19), whereby action may be taken to facilitate the return to "home roads or originating territory" of empty cars, and by which action the interests of the shipping public are best served through the expedited return of such cars.

The fact should not be overlooked that cars must be moved currently to 'originating territories.' Such movement must be made either loaded or empty. Normally the originating road has the equipment necessary to protect at least the traffic originated in the territory which it serves. Car Service Rules primarily provide for such return automatically, by returning the equipment intended for the traffic. The same result would have to be accom-

plished by 'pool handling' and could only be done by arbitrary orders or fleet movements, and experience has developed that such method of handling has not only been expensive heretofore from the standpoint of empty car mileage, but also in preventing the maximum utilization of motive power and other facilities. In other words 'fleet movements' are not in the normal traffic channels and by a disorganization of facilities create operating inefficiencies and increase operating costs.

It should be understood that during the two years of federal control the equipment of the country was pooled. Regardless of this fact, however, the empty mileage was greater than in a corresponding Car Service Rule period by 6.7 per cent.

First Cost of New Equipment

Without admitting that the number of cars, namely, 166,000, which it is proposed to build, does actually represent the requirements of the country, we think the number of cars of the stated capacity proposed is a considerable overstatement of the average requirements. In the cost of building cars labor represents less than 20 per cent of the total. It may be broadly said that $375 will cover both direct labor and overhead in the car builder's cost of a car. It is difficult to see how this could be reduced by $200, or over 50 per cent; therefore, it must be proposed to save all or the major portion of this money in the purchase of raw materials by the car builder. The car builder would have to pay the same prices for plates, shapes, etc., for steel cars, whether purchasing on behalf of the agency or an individual railway, as these are standard prices applicable to everybody, and, practically speaking, the same theory would apply to other articles such as castings, wheels, axles, etc., which vary in price largely on the basis of cost of pig iron and labor.

The agency could not buy cars in any greater amounts than the necessity of the situation required, and this would not be very much greater, if any, than the rate at which the railroads find it necessary to buy them. The controlling features seem to be the same in either case, and the only thing that the agency could do, provided they had funds available which the railroads did not, would be to distribute car purchases throughout the year, and thus stabilize the operations of the car manufacturing plants to better advantage. This might tend to equalize the car manufacturer's profits, without any practical advantage accruing to the railroads.

Car plants exist at the present time, and to reduce the capital investment in them and therefore reduce the overhead expense would require a reduction in the number of plants, as no advantage would accrue by working all of them at a small output. The overhead expense of the car plants of the country is a fixed thing and must be distributed over the cars built, regardless of the purchaser.

The saving claimed is not justified by the facts, nor is it supported by data or facts in the report.

Financing Equipment Purchases

Under normal conditions in the past, the railroads of the United States have been able to finance equipment purchases under most favorable terms and the investing public has always looked upon these securities with favor and has been willing to invest in them at rates comparable with other prime securities. There was no need of the intervention of an intermediate agency to negotiate such securities. Even if such an agency, no matter how powerful or influential, had existed, it seems incredible that it could have marketed them at a rate of interest to yield one per cent or any part of one per cent less. The general market reports indicate a return of normal interest rates and with this will come the same public faith in the value and integrity of equipment obligations which has obtained in the past, and contemporaneously a recession in present interest yields.

Reduction in Cost of Freight Car Repairs

In discussing this subject it must be remembered that the central agency proposes to handle only the heavy repairs, which are less than 5 per cent of the total cars repaired, approximately 1,000 cars per day, while the railroads would handle all the rest, or more than 95 per cent. Based on cost, the agency would handle less than 30 per cent, while the railroads would continue to handle more than 70 per cent, as they do now, except that when they do the work they would report the charge for so doing to the agency. The cars handled by the agency would be those requiring the heaviest repairs; they would send them to production shops, where the work would be concentrated as much as possible, as suitably located as possible, as the railroads send them to the home road now. If these shops are to be production shops of the kind the terms imply, they will have to be concentrated on certain classes of cars, would be relatively few in number, and if a reduction is made in the number of shops in which this class of work is done, and in the classification of work each shop will do, it will, of necessity, increase the miles these cars have to move to be repaired.

An analysis of the work done by railroads on freight cars shows that it is economically done, and that such portion as may be done improperly does not exceed that which would be expected in any operation of this kind and could not be improved by changing the organization which has the work in charge to some agency further removed from the point of operation.

Standardization of detailed car repair parts that ordinarily fail in service and require renewal or repair has been carried to such an extent by the railroads under existing organizations that the delay to cars on account of having to await repair material from the car owner is very slight. Figures furnished by 10 representative railroads, constituting a large portion of the mileage of the country, indicate that in a period of 30 days the percentage of cars repaired so held awaiting material amounted to only thirty-three one-thousandths of one per cent.

Retirement of "Weak" Cars

The proposal and estimates of savings calculated therefrom are predicated upon erroneous assumptions and incorrect basic data. If it were merely a question of car capacity, the present equipment if loaded to tonnage capacity would be more than sufficient to carry all the traffic for some years to come, but for many well-known reasons such loading is impossible of achievement. Excluding in 1921 the l. c. l. traffic and all carload commodities with average load of 35 tons or over, the remainder of the carload traffic represented 14,511,842 cars with a total tonnage of 321,220,287 tons, or an average load of 21.45 tons per car, far below the capacity of cars it is proposed to retire prematurely.

The policy advocated by the board involves the retirement within five years of 890,000 alleged wooden cars with capacity from 30 to 35 tons, replacing them with 540,000 steel and steel underframe cars of 50 tons capacity. According to statistics furnished by the Interstate Commerce Commission, all Class I roads owned only 771,561 wooden cars on December 31, 1921, a considerable number of which are of modern construction and large capacity. Records show that in January, 1921, the number in service of all box cars (steel or wood, and of all ages) under 35 tons capacity was but 406,726; coal cars, 44,899; flat cars, 28,485; and stock cars, 32,277; total of these four classes, 512,387, as against the board's estimate of 777,000 for these same classes of "weak wooden cars 20 years old and older." The cars proposed to be retired by the board include refrigerator and stock cars, for which 30 tons capacity represents the standard practice of many roads because it is ample for the usual loading of such cars. So long as the other lighter capacity freight cars are in good condition they are suitable for many classes of traffic and form a very satisfactory addition to the car supply during the heavy traffic seasons. Certainly if the roads had not owned them in the fall of 1922 their absence would have been seriously felt and could not have been entirely replaced by a lesser number of high capacity cars.

However, the board cannot claim originality for its suggestion, which is merely an endorsement of a railroad policy of long standing, excepting that the carriers, realizing the danger of impairing their car supply through too rapid retirement of the older cars, have followed the policy of replacing the old and small capacity equipment gradually as it became obsolete or reached the end of its useful life. For example, according to Interstate Commerce Commission statistics of 1920, Class I carriers increased their equipment in the 10 years previous by 1,005,775 freight train cars—this number representing nearly half their present equipment—at the same time retiring 768,808 cars, mostly of light capacity. These changes in equipment were made despite unfavorable conditions which limited car construction in the past several years. These new installations in ten years represent about twice the installations proposed by the board in a period of five years, but as stated, the carriers have retired old equipment in a more orderly and economical way than proposed by the board. It is the fixed policy of the roads to continue this practice, but no valid reason can be shown for unduly hastening the destruction of useful equipment, at great outlay, merely for the sake of trying to reach a doubtful "standard."

The end sought is not contrary to the desire of the railroads, but in the interest of efficiency and economy the transition must come gradually and in the natural course of events rather than by premature or revolutionary action. The public should also understand that it is really the gainer by the retention in service of the older cars up to the end of their usefulness, because when replaced the new cars will represent a very substantial addition to the invested capital, owing to the doubling or trebling of cost of car construction since the older cars were built.

Saving Through Improved Distribution of Cars

The data submitted by the board to support the estimated saving of $66,000,000 per annum claimed purports to represent the difference between the unit of ton miles per car per day attained

during months of heavier business over an average of five years and a figure for the remaining months of this period when a car shortage obtained. It is claimed that by reason of the agency there will be control of the equipment sufficient to assure the attainment of the higher ton mile per car per day unit. This again is translated to car days, and is calculated at the current rate of per diem, $1.00, for the 181,000 representing the decreased number of cars necessary for handling the traffic under central control with the greater efficiency possible.

The report has apparently not taken into consideration the factors upon which this measure of efficiency is based. Periods of surplus when cars are stored idle must be reckoned with; weather conditions in October and January are in no way comparable; the heavy movement of grain, coal and ore in September and October does not have its parallel during other periods of the year. All these factors are quite beyond the control of the railroads.

The report in no way proves that the common use of cars as contemplated by them is essential to the attainment of a relatively high factor of ton miles per car per day. In fact, quite the contrary may be alleged in behalf of the railroads under private operation, for the monthly records of 1920 appear to demonstrate beyond a doubt that control and operation as at that time in effect was responsible for a much higher figure of ton miles per car per day than was attained at any time during periods of pool operation.

The accelerated movement of the car itself as reflected in the figure of miles per car per day is but a partial factor of the unit under consideration. It is affected by condition of shortage or surplus, number of cars idle or out of condition, and weather conditions. This is not therefore a reliable measure in considering this question. Increase in net ton miles per car per day naturally follows increased business.

The claim is made in the report that a pool of cars will permit the shifting of cars from one territory to another, thus increasing the car supply for shipments in one territory where there is a car shortage, at a time when there is a car surplus in another territory. The railways now have an organization in the Car Service Division of the American Railway Association, which does relocate freight cars, and it is more efficient in these respects than would be another organization, newly created for identically the same purpose, and duplicating its functions. As will be demonstrated elsewhere, railroads or so-called private car lines serving the territories mentioned are in close touch with the needs thereof and will meet requirements in a way to avoid waste and without intervention. Such a course is essential to their existence.

Saving in Reduction of Switching

While the pooling of cars might in some instances result in reduced switching, the entire premise is theoretical and the estimate of 25 per cent is excessive. There can be no saving in the switching of loaded cars under a car pool or any other plan of handling equipment. Available data indicate that from 65 to 70 per cent of all cars moved are loaded cars, and any switching to be saved must be in connection with the handling of empty cars, or from 30 to 35 per cent of total car movements. It is obviously impossible to save switching to the extent of 25 per cent of the whole, as claimed, out of the 30 to 35 per cent empty car moves made, and for the reasons outlined below.

There can be no saving in the switching of special types of empty cars as such cars are provided for specific loading originating in specific territories and the empties must under a car pool or any other plan of car handling be returned to such originating territories.

The average annual yard switching locomotive mileage for the three years of the test period, 1915, 1916 and 1917, was 323,898,000, or 19.4 per cent of the total transportation service locomotive mileage. For the two years of federal control, when cars were pooled, yard switching locomotive mileage was 342,173,000, or 20.94 per cent of the total transportation service locomotive mileage. The period of car pooling, therefore, shows both an actual and a relative increase in yard switching locomotive mileage, instead of a decrease.

Standardization of Cars

The report also includes many replies to questions submitted by the Security Owners' Association. In reply to an inquiry: "Would the standardization of cars of as few types and sizes as possible be of advantage?" the report says:

"Yes, provided the number of types are sufficient to economically take care of the traffic. This, however, has nothing to do with pooling, as it will be advantageous whether or not the cars are pooled, as cars move over other than home roads under the existing conditions. If, for instance, there is more than one type of coal car and more than one type of gondola car, and there certainly should be, the different types and sizes must, so far as possible, be kept in the territory in which they were designed to serve. If only one gondola and one coal car were adopted, it would have to be a car suitable to move over the line of the weakest road, and the density of train movement of the strongest roads would thereby be increased and the economical operation of the strong carrier reduced, and the strength of the chain would be the strength of the weakest link. The ability to make cars move freely through interchange points does not depend so much on complete interchangeability of all portions of the car as it does on the interchangeability of certain parts, which must be repaired or renewed, although complete standardization is desirable if sufficient types are adopted. Therefore, even as between types and sizes, wherever possible part standardization should be further followed in order that even cars of different types might have the same part applicable to all, as, for instance, the coupler and other similar things.

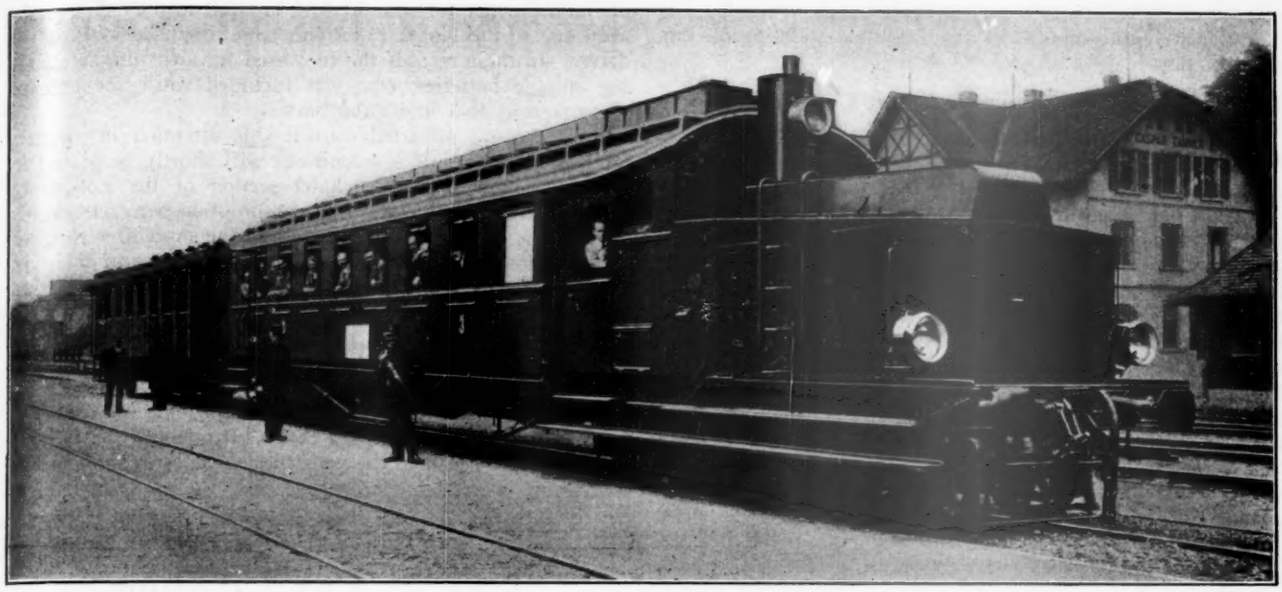
"In connection with the question of part standardization, many parts are renewed in whole, although consisting of several pieces. These parts need not necessarily be exactly alike on different cars, provided it is possible to place them in the same location; in other words, provided they interchange without modification to the structure to which they are attached. Attention is also called to the fact that standardization is a thing for the future. It is not applicable to cars that were built in the past. Therefore, it is hardly possible to obtain its advantages for years to come. Attention is further called to that fact that provision must be properly made, even if only one standard is adopted, to modify it from time to time in order to take advantage of the improved state of the art, and this in itself would produce different standards or increase the number of standards. As to whether or not such development through the course of 20 years is going to decrease materially the number of designs of cars in service throughout the country is problematical; that it will not improve materially the interchange situation is indicated by the relatively small number of cars held at interchange points at present for material that is not standard. It is evident from this information that the improvement expected by the advocates of further standardization is very much overestimated and is not borne out by the actual facts of the situation.

"The American Railway Association has for years past developed and has in effect on the equipment standards covering such parts of cars that may require renewal by the handling road and the Committee on Car Construction of the Mechanical Division is about completing their designs for further standardization of box cars.

"The statement has been made by car builders that standardization would decrease both the cost and time of delivery of cars, as they could buy their materials in advance when the market was low. Our experience is that car builders do not buy parts that are now universal standards in advance. For instance, they do not buy lumber, journal boxes, axles, wheels, couplers and other parts. There is no reason why their practice would be different even if new or different standards were adopted. All the saving in time that would exist would be the small amount necessary in such cases where the car builder must prepare new drawings. A car builder does not have to make new drawings in connection with each order by any means, in fact, many orders are for cars exactly similar to previous lots delivered by the same builder, and some railroads furnish the car builder with complete drawings with the order.

"Admitting for the purpose of discussion that the difference in design and size of box cars does exist, it must be remembered that these differences represent the development of 30 years or more and that no such variations in design exist in cars ordered by the various lines as of today. We do not suppose it is proposed at once to rebuild all the box cars of the country and of necessity the standard proposed would have to apply to the cars of the future. As a matter of practical business, it would take from 20 to 30 years to replace all of the existing cars, and even if we should adopt a standard car today, the changes in the state of the art will require, in the interest of economy, many changes in design in the next 30 years."

NEAR LUCKNOW, PA., four miles west of Harrisburg, on Sunday last, an an automobile without a steersman ran about three miles on the roadbed of the Pennsylvania railroad, kept in line by the rails of the track. The man in the automobile had been injured by running his car into a tree, and made unconscious; and he was in the car during the three mile trip. His plight was noticed by a signalman who telephoned to the next station, three miles away, where the automobile was stopped. The accounts say that the car moved at about 10 miles an hour.



Swiss Diesel-Electric Motor Car with Trailer

Sulzer Diesel-Electric Rail Motor Car

Car With 200-hp. Diesel Engine Seats 69 Passengers and Shows Low Fuel Consumption on Swiss Railways

FOLLOWING the experiments with a direct-driven Diesel locomotive on the Prussian State Railways in 1913 orders were placed with Sulzer Brothers, Winterthur, Switzerland, for five self-propelled rail cars to be driven by Diesel engines coupled to electric generators with electric motors geared to the driving axles. Three of these cars were for use on the Prussian railways and two on the Saxon railways. Two of the cars were delivered and operated satisfactorily before the outbreak of the war, but since that time conditions have been such that no further development was undertaken until recently.

In taking up the work again the manufacturers, Sulzer Brothers, decided to take back the cars and equip them with engines of a new and improved type together with new electrical apparatus that had been perfected by Brown-Boveri of Baden. It is one of these rebuilt cars, now being tested out on the Swiss Federal Railways, that is shown in the illustration.

General Description of the Cars

The car is of standard gage and approximately 70 ft. long over buffers. There is an engine compartment at one end and operating platforms at both ends, the car being so equipped that it can be driven with equal convenience in either direction. Seats are provided for 69 third-class passengers with standing room for 16 more. Entrance and exit is made at either end through the roomy driving platforms which are separated from the body of the car by sliding doors.

The light weight of the car is 146,600 lb., 85,200 lb. being on the six-wheel truck on the engine end and 61,400 lb. on the four-wheel truck on the motor end. These weights correspond to an axle load of 28,400 lb. on the engine end and 30,700 lb. on the motor end.

The driving power is obtained from a six-cylinder, four-cycle Diesel engine of the Sulzer "R V" type which is connected to a direct-current generator through a flexible coupling. The fuel is injected directly into the cylinders through the injection valves without the employment of injection air, the necessary pressure being furnished by combustion of a part of the fuel itself. By the adoption of electric starting, obtained by a suitable winding of the generator and by the installation of storage batteries, air compressors with complicated valves and control mechanism which were used on the original installation have been dispensed with and the general design considerably simplified.

The three pairs of cylinders are arranged in a V form, each pair of pistons being connected to a common pin of the three-throw crank axle. The crank case is enclosed and provided with inspection covers while the cam shaft is parallel to the crank axle. The engine when running at 440 r.p.m. develops 200 hp. and is capable of delivering 250 hp. for a short time. It is designed to be run at a constant speed regardless of the speed of the car. The governor and feed pumps are placed in front of the engine, the control being such that each cylinder may be cut out automatically from the driving cab or controlled by the governor in the usual manner.

The exhaust muffler and the air inlet manifold are placed between the cylinders with the fuel tank above them. The capacity of the tank is 350 liters (92½ gal.) which is sufficient for a run of 50 km. (314 miles) under average conditions.

The cooling water after leaving the cylinders passes to a series of ribbed coolers on the car roof. These are so grouped in combination with the water reservoir that by cutting units in or out the desired temperature can be maintained regardless of weather conditions and temperatures.

Vibration is avoided by mounting the engine and generator on a special frame which is not connected to the body of the car but is carried directly on the truck frame through spring connections. The weight of the front end of the car is carried by a spherical pivot which acts as a center pin and rests on a modified truck bolster.

The capacity of the engine is sufficient to drive the car at

a speed of 70 km. or 44 m.p.h. on level track. When hauling a trailer weighing 66,000 lb. the available speed is 60 km. or 37 m.p.h.

Electrical Equipment and Control

The main generator is separately excited, the exciting current being furnished by a special dynamo mounted on an extension of the generator shaft. The main generator is of the eight-pole type and has a capacity of 140 kw. with a terminal voltage of 300 while the exciting dynamo is of the six-pole type with an output of 7.5 kw. The accumulator battery feeds the field windings of the exciter. The circuit between the generator and the motors is so arranged that the engine can be run at a constant speed regardless of the speed of the car. This insures easy starting, full control of the speed of the car and economy in fuel consumption.

Two direct-current motors are mounted on the four-wheel truck on the rear end of the car. They are fitted in a common cast steel casing and both are geared to a crank shaft which carries crank discs, connecting rods being employed to transmit the power from the crank discs to the driving wheels. The motors are series wound with six main poles and six inter-poles. The engine is started by using the generator as a motor operated by current from the storage battery underneath the car. Direction switches and controllers are provided on either platform. The controller handle is of the dead-man type and if not held down the current is shut off and the brakes applied. A time relay with a retarding cylinder holds back the application of the brakes until five seconds have elapsed from the time the current is cut off.

The brakes are of the Westinghouse type, the compressed air being supplied by a small air compressor driven by the engine. In emergency applications, the current is automatically cut off. Hand brakes are also provided.

Operating Results

On a somewhat hilly road between Wallisellen, Winterthur and Romanshorn with the car alone without a trailer, the fuel consumption was 84 kilos or 185 lb. for the round trip of 92 miles, which is equivalent to 0.03 lb. of fuel per ton-mile. The load was subject to frequent variations and the engine was shut down on the longer grades, being in operation only about two-thirds of the time.

Records covering a month's service on the Baden, Wettingen and Niederglatt run showed an average fuel consumption of 0.043 lb. per ton-mile. The consumption was at the rate of 0.047 lb. per ton-mile at first but fell to 0.040 lb., probably due to the longer experience and increased skill of the driver. In these records the fuel used for switching, recharging storage batteries, etc., was included while the mileage was taken as that in regular service.

This car has attracted considerable attention in Switzerland and as a result a second car will shortly be placed in service on the Berne-Neuchatel section of the Lotschberg railway. Not only has the fuel consumption been remarkably low but the small stand-by losses and the short time required for attention at terminals have shown that a car of this type possesses decided advantages over steam operation. Fifteen minutes is sufficient to start the engine, charge the air brake system and have the car ready to start. Even less time is required to shut down and leave everything in order.

The car is of moderate power but its range is considerable and its size is much larger than most of the gasoline rail motor cars used in the United States. It is hoped that further experience will lead to the construction of large units which will result in a Diesel locomotive.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ended January 27 continued greatly in excess of the loading for the corresponding weeks of previous years. The total was 871,164 cars, as compared with 740,386 in 1922 and 701,605 in 1921. The loading of livestock, coal, coke, forest products, ore, merchandise and miscellaneous freight all exceeded the figures for both of the past two years, while the loading of grain and grain products exceeded that for 1921 but was less than that for last year. The loading of miscellaneous freight was 77,699 cars greater than that for the corresponding week of last year while the loading of forest products was 22,654 cars greater. Loading in all districts was also in excess of that for both years except in the Pocahontas district where it was slightly below that for last year.

For the week ending January 22 the average car shortage was 72,754 cars, a decrease of 588 as compared with the previous week. This included 26,961 box cars and 37,508 coal cars. Surpluses amounting to a total of 26,485 were also reported.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, JANUARY 27, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded	Corresponding period 1922	Corresponding period 1921
Eastern	1923	7,201	3,584	56,077	3,235	5,895	2,667	54,240	74,437	207,336	.....	.....
	1922	8,166	2,968	41,704	1,700	5,310	597	58,325	58,419	.....	177,189	161,127
Allegheny	1923	3,623	2,961	57,512	7,235	3,277	2,823	43,840	70,742	192,013	.....	.....
	1922	2,599	2,978	48,704	3,716	2,673	679	43,541	42,983	.....	147,873	147,592
Pocahontas	1923	226	65	20,490	551	1,419	177	5,758	3,651	32,337	.....	.....
	1922	240	75	23,060	185	1,050	63	5,252	2,862	.....	32,787	26,358
Southern	1923	4,191	2,367	25,213	1,213	20,724	1,169	36,530	39,761	131,168	.....	.....
	1922	4,377	2,266	25,189	479	13,417	471	35,483	30,683	.....	112,365	107,709
Northwestern	1923	15,599	10,555	8,956	1,717	22,173	1,078	24,979	32,194	117,251	.....	.....
	1922	14,519	9,798	10,980	1,073	13,835	457	23,901	22,544	.....	97,107	94,790
Central Western	1923	11,450	13,243	21,109	431	7,211	3,716	31,062	40,883	129,105	.....	.....
	1922	15,419	11,789	24,890	237	4,365	840	29,247	31,164	.....	117,951	105,942
Southwestern	1923	4,529	2,661	5,381	121	8,914	458	15,470	24,420	61,954	.....	.....
	1922	5,078	2,362	5,289	137	6,309	869	15,336	19,734	.....	55,114	58,087
Total western districts	1923	31,578	26,459	35,446	2,269	38,298	5,252	71,511	97,497	308,310	.....	.....
	1922	35,016	23,949	41,159	1,447	24,509	2,166	68,484	73,442	.....	270,172	258,819
Total all roads	1923	46,819	35,436	194,738	14,503	69,613	12,088	211,879	286,088	871,164	.....	.....
	1922	50,398	32,236	179,816	7,527	46,959	3,976	211,085	208,389	.....	740,386	.....
	1921	39,964	32,377	163,430	9,513	52,486	8,128	184,389	211,318	.....	.....	701,605
Increase compared	1922	.....	3,200	14,922	6,976	22,654	8,112	794	77,699	130,778	.....	.....
Decrease compared	1922	3,579	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	6,855	3,059	31,308	4,990	17,127	3,960	27,490	74,770	169,559	.....	.....
Decrease compared	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
January 27	1923	46,819	35,436	194,738	14,503	69,613	12,088	211,879	286,088	871,164	740,386	701,605
January 20	1923	48,280	33,790	192,824	13,817	70,066	10,900	210,860	285,041	865,578	731,109	708,658
January 13	1923	51,034	37,500	198,686	13,795	68,632	10,763	211,253	281,588	873,251	714,191	715,85
January 6	1923	45,498	31,686	187,746	13,028	57,530	9,718	182,840	242,257	770,303	599,433	697,64
December 30	1922	45,931	26,188	173,378	12,108	44,913	8,175	177,624	222,883	.....	711,200	528,55

Compiled by the Car Service Division, American Railway Association.

Labor Board Chairman Answers Union Critics

B. W. Hooper Denounces Socialistic Propaganda Put Out by Organization Leaders

"THE LABOR LEADER who, day after day, teaches his followers that everything that is is wrong, that our government is tyrannical, our laws unjust, our courts crooked and corrupt, and that labor is the downtrodden victim of powerful and malignant enemies, will some day wake to find that he has kindled a fire which he himself cannot extinguish."

This warning was given to the editors of certain railway labor union magazines by Ben W. Hooper, chairman of the Railroad Labor Board, who, on February 1, replied to the attacks which have been made upon the board and the individual members thereof by those in control of these publications. Chairman Hooper's reply, in the form of a letter addressed to the editors of those magazines which have joined in this criticism, adds:

"Organized labor may acomplish great good for its membership and for society in general, or it may by the adoption of unwise methods injure those whom it represents, as well as all mankind. No man ever carried a heavier responsibility than the leader of a great labor organization during this unsettled period of the world. If he is a man lacking in calm judgment and self-restraint, devoid of patriotic devotion and dominated by passion and prejudice, he will probably build up a radical feeling among his followers that will pass beyond his own control. Some day in a critical emergency, he may feel constrained to counsel his organization to pursue a moderate and conservative course, but he will realize that such advice will not be heeded. Then he will get in front of his men and lead in the direction that he knows they are determined to go, and will defend his course by saying that he merely obeyed the wishes of his organization. This will not be the truth, for he will be responsible for having developed the sentiment which finally swept him along unwillingly in front of it.

"This is something like a man collecting and damming the waters of a multitude of small streams until he has built up a great head of water and when the dam bursts and the floods destroy, he blames the waters for the calamity.

"From time to time," Chairman Hooper said in opening his remarks, "the magazines of the various classes of railway employees have indulged in emphatic criticism of the Railroad Labor Board and certain of its individual members. Doubtless, some of these criticisms have been well-grounded, for it has not been humanly possible for the board to dispose of approximately 9,000 disputes in about 21 months without making some mistakes and committing occasional injustices. On the other hand, if the board had never made a single mistake—if its decisions had been 100 per cent accurate and just—it is absolutely certain that it would have been frequently criticised both by the carriers and the employees.

"It is not my purpose, however, to engage in discussion of the work of the Labor Board. A defence of any specific official act of the board or of any of its members would be of doubtful propriety. Let the record speak for itself—the entire record and not any isolated or garbled portion.

"The matters to which I desire to refer are certain questions of public policy outside the jurisdiction of the Labor Board, but intimately related to the welfare of both the railroads and their employees and, consequently, the people at large. My publicly expressed views in regard to these matters have been attacked by several of the employees' magazines. Some of them did me the honor to quote all or a part of what I had said, and some contented themselves with attacking my utterances without permitting their readers to know what they really were. Some of them drew the illogical and unjust inference that my views on these purely public questions indicated an unfriendly attitude toward the employees in the discharge of my official duties.

"In the interest of fair discussion, perhaps you would be willing for your readers to know exactly how I feel as a citizen in regard to the matters in question. You will concede that it is my right as a citizen to entertain convictions on these subjects and, undoubtedly, my duty at the proper time and place to express them. Such expression, frankly made, might be conducive to an improved mutual understanding.

"I recognize the right of labor to organize and to bargain collectively, but this right carries with it a corresponding responsibility. Neither one lone man nor one lone dollar possesses the power to very greatly affect the general public, for good or ill. When dollars are piled up by the billions, their power may become so enormous that the people must be safeguarded against capitalistic oppression. When labor combines in organizations comprising millions of men, its power becomes so great that the public must be protected against the abuse of this power.

"Neither organized labor nor organized capital can be permitted to use its power without regard to the rights of the public at large, nor, on the contrary, can the public afford to grant to either any special privileges or unfair and unjust advantages.

"Do not understand for a moment that I am arguing that organized labor should content itself with all existing conditions and make no effort for their betterment. The enormous growth of modern industrialism has produced inequalities and injustices that call for readjustment, but this process or readjustment should be constructive and not destructive. It should be carried on under the orderly procedure of a constitutional republic. Of course, this line of reasoning has no force with communists and socialists who desire to change our form of government, but it should sink deeply into the minds of the sensible, level-headed men who constitute a great majority of the railway employees of this country.

"Just here is where I seem to have 'gotten in bad' with some of the heads of railway labor organizations. I have said, in substance, and I now repeat, in the utmost sincerity and kindliness, that I think it was a grave mistake for these leaders to enter into a political alliance with the socialists in the recent Cleveland conference. Some of them may say that they did not contemplate entering the socialist party. Very true, but when a fellow lines up alongside the devil and agrees to join him in any kind of fight, and the devil joyfully welcomes his assistance, it is time for that man to begin to get suspicious of himself.

"The ultimate aim of socialism is to overthrow our government and set up in its place an experiment that has never been proven to be a workable thing. And, that is not all of it. Socialism, in its last analysis, will destroy three things that railway men do not want to destroy—namely, private property, the family, and the state. With these blotted out, there would be but little difference between a man and a beast. Moreover, every man would become a conscript servant of the socialistic regime, working for everybody else but himself. My own notion is that a gov-

ernment which has given labor the greatest prosperity, happiness, and freedom that it ever enjoyed in any age or land, and which holds out the hope of unlimited advancement, is a good sort of government to stand by.

"My ideas of the railroad and railroad labor situation in general may be condensed as follows:

"First, to recognize the unquestioned fact that the people of this country are not going to establish government ownership of railways until the system of private ownership and operation under government regulation has been demonstrated to be an absolute failure, and the further fact that such failure will be surely followed by government ownership.

"Second, for everybody concerned to buckle down to business and do his best to make the present system furnish the people efficient service at a reasonable cost. Neither management nor employees should designingly endeavor to bring about a collapse of the present system because they think government ownership would be better, for, although some of us think that it would be better, nobody really knows that it would be better for anybody. Nobody has any assurance that government ownership of railways will give the public better service and cheaper rates, and the employees better wages and working conditions. It might do the opposite in both cases. Moreover, destroying private ownership by any kind of unfair means would hurt everybody concerned while the process was under headway, would result in increased resistance by the public, and, if government ownership resulted, it would be inaugurated by the public in a resentful and grudging way. All of this would work incalculable harm to the employees.

"Third, let the people rest contented that whatever questionable things may have been done in railway financing in the past, the recurrence of such things can be easily prevented through the Interstate Commerce Commission in the future.

"Fourth, let the railway employees and the management make a renewed effort to co-operate amicably and to restore the old-time morals to the service. To bring about this end, the comparatively few hard-boiled railway managements should discontinue their efforts to break down the organizations of the men and to ignore the rights of the majority. There can be no question but that certain railroad managements have shown a disposition since the termination of federal control to gouge and nag the organizations and to refuse them a square deal. This has been deeply resented by the men.

"Fifth, there should be no letting down of the bars for the promiscuous admission of enlarged hordes of laboring men from foreign lands whose training and customs unfit them for Americanization, and whose presence will only serve to beat down the wages of our own citizens.

"Sixth, there should be an increasing realization among the employees that the people of this country are not going to tolerate the use of force in the settlement of railway labor controversies, either under public or private ownership; and there should be a corresponding recognition on the part of the public of the justice and reasonableness of paying good wages to those who peaceably operate this indispensable public utility, and the fullest consideration of the skill, hazard and responsibility required.

"Seventh and last, I would venture to suggest that the leaders of the organizations refrain from such indiscriminate, intemperate, and ill-considered attacks on the government, its courts, tribunals and institutions as will engender bitterness, and class hatred that will ultimately prove to be a withering curse to those who indulge these passions. The struggle for the advancement of labor will be more effective in the long run, if we will all keep uppermost in our minds the well-being and perpetuity of the Republic which railway employees, with practical unanimity, still love and reverence."

Annual Report of Director General of Railroads

WASHINGTON, D. C.

THE ANNUAL REPORT of James C. Davis, as director general of railroads and agent of the President in the liquidation of liabilities growing out of or connected with the federal control of railroads, has been filed with the President and by him submitted to Congress.

As the result of the taking of their property and its operation by the government for the 26 months of federal control the carriers had presented claims up to December 31, 1922, aggregating $952,642,068. This represents a fraction over 98 per cent of the main line mileage under federal control, and when the remaining claims, representing the two per cent of mileage still outstanding, have been filed, it is estimated that the total claims filed by the carriers against the Railroad Administration will amount to $970,094,060.

During the year last past claims aggregating $284,403,805 have been settled. In making these settlements $78,095,205 was paid to creditor roads, and $39,974,017 was collected from debtor roads, resulting in a net expenditure by the government in arriving at these adjustments of $38,121,187.

The total amount of claims of the carriers settled by the Railroad Administration up to January 1 aggregates $731,921,814, and the net cash payments in effecting these settlements aggregate $171,815,541. This was after $379,436,625 of additions and betterments had been charged to the carriers.

These settlements represent 80 per cent of the main line mileage under federal control. It is believed that the claims of the remaining 20 per cent of main line mileage will be adjusted by October 1, 1923.

It is worthy of note that in making the settlements to date but one Class I road has failed to agree with the Railroad Administration and resorted to litigation.

Since September 1, 1921, the director general, under authority from the President, has sold $274,009,350 of equipment trust notes at par and accrued interest. The sale of these certificates, together with the collection of other assets belonging to the Railroad Administration, has provided sufficient funds to complete the liquidation of all liabilities of the Railroad Administration without asking Congress for any additional appropriation.

Except for lap-over litigation and checking of accounts, Director General Davis predicts that the substantial work of the administration will be completed during the year 1923, and the report indicates that after all obligations of the government growing out of federal control have been paid the Railroad Administration will be able to turn over to the Treasury, in obligations of solvent railroads and unexpended appropriations, an amount aggregating some $400,000,000.

There is now to the credit of the Railroad Administration an unexpended balance of appropriations amounting to $291,642,675. This includes reappropriations of funds received from carriers in the liquidation of their obligations and through sales of securities. Total disbursements of the Railroad Administration from the termination of federal control on March 1, 1920, to December 31, 1922, amounted to $1,023,449,875. This includes $8,747,462 of payrolls and $11,878,468 of other expenses of the Railroad Administration. The present balance is largely accounted for by the sale of equipment trust notes, of which $346,556,750 was taken by the director general in payment for equipment. Of this amount $33,298,200 was collected on the maturity dates, $274,009,350 was sold at par and accrued interest ($133,811,650 during 1922) and $39,249,200 are still held by the Railroad Administration.

The amount due the carriers in final settlement of claims undisposed of on January 1 is estimated at $346,415,838, including $124,169,271 of unpaid compensation, $82,440,-

026 of cash taken over from the working capital of carriers at the beginning of federal control and $97,704,365 on account of depreciation. On the other hand there is due the government from the carriers on account of additions and betterments made during federal control $290,501,799, so that the estimated net amount due the carriers in completing final settlement would be $55,914,039. This estimate is based on the assumption that future final settlements will be made on the same general lines as those that have been completed. Definitive obligations of carriers to the amount of $199,498,600 were held on December 31, including $28,727,900 of bonds and $131,521,500 of notes.

In making the settlements to date but one Class I road, the Seaboard Air Line, has failed to agree with the Railroad Administration and resorted to litigation. Only three Class I roads have not yet filed their claims and Director General Davis predicts that not to exceed half a dozen companies will fail to agree with the government in arriving at final settlement. The companies which refuse adjustment must, under the provisions of the federal control act, present their claims to referees appointed by the Interstate Commerce Commission. The finding of the referees is reviewable by the courts and protracted litigation with those few carriers that do not make an amicable adjustment may result.

Of the $1,144,681,582 expended by the Railroad Administration for additions and betterments during the 26 months of federal control, $381,649,957 was for equipment and was paid for by the carriers in cash or equipment trust certificates and $42,250,000 was funded under special adjustments prior to final settlement, leaving a balance of $720,781,625 to be adjusted in final settlement. Up to January 1, 1923, $379,436,625 of additions and betterments were charged to the carriers in making the final settlements and $50,843,000 was funded, leaving a balance of $290,501,799 still to be disposed of.

Claims to the amount of $3,178,539 have also been filed by 190 short lines, and $341,972 has been paid to 35 of these in settlement. Proceedings are now pending whereby an authoritative construction of the rights of the short lines, which are much in dispute, may be obtained from the courts. Claims of third persons against the Railroad Administration for loss and damage, personal injury and fire, to the amount of $83,503,113 were pending on October 1 in some 16,700 actions. This is exclusive of the Minnesota fire claims which amount to $56,500,000 and on which $8,465,257 had been paid. On reparation claims by shippers on account of alleged unreasonable charges or overcharges during the federal control period, payment of $1,059,940 on informal awards of the Interstate Commerce Commission, and of $1,935,433 on formal awards, has been authorized.

"Subsequent to federal control," the report says, "there has been a reluctance on the part of the carriers to vigorously contest these demands with shippers who are their present patrons, and practically all of the important controversies in this connection have been taken care of by the central administration here in Washington."

On account of the liabilities of the inland waterways the Railroad Administration has paid out $4,734,801.

During the year 1922 an average of about 1,200 persons were in the employ of the Railroad Administration and their compensation was $3,110,786.

"The result so far obtained in making final adjustments with the carriers amply justified the maintenance of the existing organization," the director general says, "and, in my judgment, has resulted in a saving of many hundreds of millions of dollars to the government.

"The organization of the Railroad Administration is altogether unique from a governmental standpoint. There is not now and never has been any politics in the organization. Being temporary in its character, it is not under civil service rules. All persons holding positions of any importance in the administration have had more than 20 years of active corporate training and experience. There is little governmental red-tape in the organization and it is conducted upon the lines of efficiency of a well-managed and successful corporation."

As the total appropriations for the Railroad Administration amounted to $1,750,000,000, if the director general can turn back $400,000,000 to the Treasury the government's loss for the 26 months of federal control would be $1,350,000,000, to which should be added the payments made on certificates of the Interstate Commerce Commission for the six-months' guaranty period of 1920, which the commission estimates at $536,000,000, plus $15,000,000 which it estimates will be paid to short lines, or a total of $1,900,000,000.

Twelve Years' Experience With Alternating Current Traction

TWELVE YEARS' OPERATION of electric traction on the London, Brighton & South Coast Railway is the title of a paper submitted to the Institution of Civil Engineers in England on January 9, 1923, by Henry Walter Huntingford Richards. An abstract of the paper follows:

Rapid development of electric traction has been prevented by the European war, and, since its termination, by various other factors. This period of comparative inaction, however, has, perhaps, permitted experience in practical operation to be gained, sometimes with unexpectedly heavy traffic under conditions of reduced facilities. Important sections of the suburban lines of the London, Brighton & South Coast have now been operated electrically on the single-phase system, at 6,700 volts, for about 12 years.

The author puts forward the following as the main principles on which operation should be based: (1) Maximum reliability of equipment compatible with reasonable financial considerations; (2) arrangement of renovation and general work so as to prevent undue fluctuation of costs; (3) continual effort to improve the life or working of the equipment. The following measures are suggested to assist in the application of these principles: (1) A group method of organization for correctly allocating the costs of labor and material against the section concerned; (2) a clear division of all work under the two main headings of "running-maintenance" and "repairs"; (3) preparation of graphic records and statistics of all results of practical operation and their circulation among the staff concerned.

Rolling Stock—Electrical Equipment

The efficiency of the current-collector gear is of fundamental importance, a difficult matter when the contact-wire varies in height from 13 ft. 9 in. to 20 ft. and has occasional steep gradients. The original bow-gear is running today, with only slight modifications, on every motor-coach. The operating-springs are set to standard lengths at coach overhauls so as to maintain a pressure of 12 lb. on the bow-strip at a trolley-wire height of 16 ft.

As usual for motor-coach equipments, the control is of the multiple-unit type. There are three principal train-circuits, namely, high tension main circuit at 6,700 volts, low tension power circuit at 450-750 volts, and low tension control circuit at 300 volts. It is found that a new motorman can obtain a working knowledge of the control system in from two to three weeks. The presence of the high tension chamber in the guards' compartment has caused no trouble.

The motors in use today are of the Winter-Eichberg single-phase compensated repulsion type, designed about 15 years ago. Most of the motor troubles have been due to

weakness in the mechanical design, and improvements have resulted in train defects being reduced by about 75 per cent. Split gears have been used hitherto with varying results, but gear-wheel and pinion lives of 250,000 miles have frequently been obtained. Solid gear-wheels of present-day manufacture should enable lives up to, or perhaps exceeding, 500,000 miles to be expected.

The transformers have so far been very satisfactory and reliable, only five defects having occurred among 71 transformers of the 310-kva. type, many of which have now reached 500,000 miles. After about 10 years' service the sheet insulation between the high tension and the low tension coils were renewed, and it is hoped that a considerable further life will accrue before further attention is required.

Rolling Stock—Mechanical Equipment

In motor-coach trucks every effort should be made to keep all clearances down to the minimum practical limit of wear. For this purpose axle-box horn-checks have been fitted with U-shaped gun-metal liners, and similar attention has been given to all other points of wear, on bolsters, transoms, etc.

Good braking is of the utmost importance. The Westinghouse automatic air brake, combined with clasp brakes and an automatic slack-adjuster, enable an average deceleration of not less than three feet per second to be maintained, and the brakes to be released within about three seconds. Drivers' brake-valves are cleaned and greased in position once in three months, and triple valves once in six months.

The original decision to use "side-door compartment stock" has been completely justified by the operating results obtained. Trains can be emptied and filled at terminal stations in about the same time as the motor-man takes to walk from one end to the other. All the original slam locks of the safety-catch type, with internal operation, are still in use. The voltage provided for train-lighting is 300 volts, and four lamps are placed in series on each circuit. There are four 21-watt lamps in each compartment, but on different circuits.

Repair Shops

Repair-shop and car-shed facilities are limited, and it is important, therefore, that both general overhaul and inspection work should be kept strictly within the mileage limits fixed for each job. Further, detail inspection is done by day, once in three weeks, and night work is confined to indispensable electrical and mechanical examination. General overhaul of motor-coaches takes place at 60,000 miles, equivalent to 18 months' running, and of trailer-coaches at 120,000 miles.

Electric Track Equipment

In order that the current-collection by the bows may be good, considerable attention has been given to rendering the trolley-wire absolutely flexible at all points. It is also desirable to provide the overhead construction with such uniform strength and resistance to deterioration that inspection and minor repairs can be safely eliminated, and that renovation can be carried out in a wholesale and convenient manner, like the renewal of track, thus effecting the greatest economy. On sections where there is no steam traffic the renewal of catenary and dropper wires necessitated by corrosion is only about 10 per cent of that on sections where a heavy steam traffic is still running. The rate of wear of the trolley-wire has been found to be almost directly proportional at any point to the amount of current collected there.

Two central distributing switch-cabins, with one attendant in each, together control the supply and distribution of energy to the whole 70 miles of electrified line. When necessary, the trolley-switches in local switch-cabins are operated by the staff at the station concerned in accordance with telephone instructions from one of the central switch-cabins. As the whole line is divided into five group-sections, for which group-switches with instantaneous tripping are provided in the central switch-cabins, switch-gear operation and maintenance is chiefly confined to these group-switches. An advantage of high tension distribution is that the difference between fault and normal currents is very marked, and the consequent automatic location of faults materially conduces to safety and reliability of operation.

Train Handling

The characteristic of the motors is such that the use of only five controller-steps increases the voltage in such a way as to obtain almost uniform acceleration until a comparatively high speed is reached. Motor-men accelerate the train according to the value of the current indicated by an ammeter, and the points for shutting off current are marked by "coasting-boards" fixed at the side of the line. During 1921 the average energy-consumption was 75.8 watt-hours per ton-mile, the train service being 5,959,737 coach-miles, with a distance between train-stops of 1.14 miles, an average running-speed of 24.36 miles per hour, and a schedule speed of 22.11 miles per hour including stops. A series of test runs was recently taken over a range of 0.4 mile to 9 miles between stops, from which it appeared that for the latter distance an average running-speed of 33.1 miles per hour could be obtained with an energy-consumption of only 40 watt-hours per ton-mile.

A Rust Inhibiting Compound

A COMPOUND for use in protecting iron and steel surfaces, either polished, finished or rough, from corrosion has been developed by the Dearborn Chemical Company, Chicago. This compound, which is marketed under the trade name No-Ox-Id, is made up of a base of petrolatum to which have been added other soluble ingredients, the purpose of which is to quench the tendency for a limited amount of corrosion to take place under a protective coating of inert material. These inhibiting materials are of such a nature that surface moisture or impurities in the metal itself which usually result in some rusting of the protected surface oxidize the ingredients of the compound instead. Numerous tests have been made in which it is said that the compound has completely protected highly finished surfaces from oxidation under both ordinary weather exposure and extreme conditions artificially created.

The compound is made in 10 grades of varying consistency to meet the requirements of different conditions of exposure and application. The pour tests of these grades range from a maximum of 125 deg. to a minimum of 25 deg. F. The material may be applied either by dipping, brushing or spraying. For dipping, with the compound at temperatures ranging from 80 deg. to 180 deg. F. for the different grades, the covering capacity varies from about 600 to over 1,000 sq. ft. per gal.

Some of the railroad uses to which this material is adapted are the protection of car journals and axles, wheel fits, boiler tubes, castings and other material in storage, machines out of service, equipment in tool rooms, steel work in roundhouses, the surfaces of water tanks in contact with tender frames, the insides of water and air tanks, angle bars, track bolts, etc. It is also adapted to use between the plates in assembling plate springs.

The compound is said to be entirely free from injurious effects, and to retain permanently its original consistency, with no tendency to gum. The lubricating qualities of the petrolatum base are unaffected by the other ingredients of the compound, making it unnecessary in some cases to remove the protective coating before parts are assembled for service.

Testing Large Capacity Scales by a New Method

THE FEDERAL BUREAU OF STANDARDS has developed an interesting precision method for testing railroad master track scales. In this system the scientific principles of the laboratory have been introduced into the field work to obtain indications of the scale up to and sometimes beyond the point where they do consistent work. Introduced for standardizing large scales where the question of accuracy is of prime importance, it has been found not to increase materially the time required for making thorough tests and to permit a saving in time in covering a given amount of ground.

The method is used by the Bureau of Standards in standardizing the railroad master track scales of the railroads

A View of the Position of the Pointer and Scale Used in Making the Precision Test

throughout the United States. These master scales are used for adjusting the weight of test cars which are in turn employed for testing the ordinary railroad track scales used in commercial railroad car weighing. All properly established railroad track scale weights are derived at one stage through devices tested by this method.

The chief feature of this method of testing is that the indications of the beam are made definite and determinable to a high degree of precision by means of a pointer and scale so arranged that the position of the beam can be read to a minute fraction of an inch; and the effects of friction are reduced and in a sense eliminated by making the required observations on the freely swinging scale beam from which the true position of equilibrium is determined with great exactness. In the arrangement found most satisfactory and which is recommended, a light rule, graduated to millimeters or to 20ths of an inch, is secured to the end of the swinging beam near the trig loop, and a pointer attached to the trig loop and arranged so that for any position of the beam there is a corresponding reading to be had of the pointer on this ruled scale.

For any particular load or determination, the weight on the platform is adjusted to bring the beam to an approximate balance and the position of the beam at equilibrium is expressed in terms of the pointer reading. The load is then changed and the new position of the beam at equilibrium is read on the scale. Having found how many graduations are represented by the change in position of the swinging beam under the added load, the value in pounds of one graduation of the ruled scale is determined; after which the load required to bring the beam to the center of its play in the loop can be computed instead of by making trials for determining the balancing load. The amount of weight on the platform corresponding to a deflection of one division in the position of equilibrium is called the sensibility reciprocal, or "Sr," for short.

In testing a scale a known test load is applied on the platform and standard counterpoise weights are applied on the beam. The lack of correspondence between the weights on the platform and the counterpoise weights on the beam gives the error in the scale. If the deflection of the swinging beam from true center as determined by means of the graduated scale, pointer and sensibility reciprocal shows the scale to be fast 1 lb. per 1,000 lb., for example, in the testing it first balanced so that the beam is in the center of its play at zero load. If then the ratio of the scale is 1,000 to 1 and a 10,000 lb. weight is placed on the platform and a 10 lb. weight is placed on the counterpoise of the beam, the scale will not balance, but the beam will be high. To obtain a balance, an application of the sensibility reciprocal to the scale reading shows that it will be necessary to remove 10 lb. from the platform or in the ratio of 1,000 to 1, to add 0.01 lb. to the counterpoise. Since it would not be possible to remove any of the solid 10,000 lb. weight on the platform, the difficulty is encountered of having to use small weights on the counterpoise, which is undesirable. To obviate this difficulty, the scale under the bureau's method would first be balanced with 20 lb. on the platform; then, when the 10,000 lb. weight is placed on the platform and the 10 lb. weight is placed on the counterpoise, it is possible to balance the scale by removing 10 lb. of the 20 lb. placed on the platform. Thus, it would not be necessary to use small weights for counterpoise. Where, therefore, the scale is balanced at zero load with a few weights on the platform, weights of large

Testing a 120,000 lb. Scale, Using 5,000 and 10,000 lb. Test Weights

denomination can be applied to the platform and the weights corresponding to the nominal amount required to balance can be placed on the counterpoise and the balance can be determined by suitable changes in the small weight on the platform.

This method of test gives results of a reliability far beyond any previously achieved. Variations in the scale performance and erratic behavior which escape observation in any ordinary test may be made strikingly apparent by the new method. It is often possible to read on the beam the effect of an ounce or two added to the platform of a fully loaded 120,000 lb. capacity scale.

The advantages of the method are several. A complete record is made of all observations so that nothing is left to uncertain or delayed entries which often characterize other tests. The effect of the personal equation and unconscious

prejudices of the observer which often influence other tests may be practically eliminated. The results may be checked after the observations are made so that omissions become very apparent and mistakes can generally be discovered and often corrected with reasonable reliability. As before stated, in practiced hands the test can be carried out more rapidly than is the case when ordinary methods covering the same ground are used. An important factor of the test is that when disturbing factors such as air currents, drafts, vibrations, etc., are present it is possible to obtain data which otherwise could not be secured. The motion of the pointer can be watched and recorded and quiet intervals can be recognized and used. The disadvantage of the method is that a higher grade of skill is called for as, in order to continue the test without undesirable delay, a knowledge of the use of the slide rule is necessary so that computations may be made promptly.

Three Collisions on the Union Pacific

THE INTERSTATE COMMERCE COMMISSION has just issued a report, dated December 20, and signed by W. P. Borland, chief of the Bureau of Safety, on three rear collisions which occurred on the Wyoming division of the Union Pacific on the night of November 4, all within two hours and all within a space of about 50 miles. The first one caused no deaths or injuries; the second caused the death of one employee and the injury of one, and the third the death of three employees and the injury of one.

These three collisions, because of unusual circumstances, are described in a single report. A severe storm of rain, sleet, snow and high wind figured prominently in the causes of all of them.

All of the trains were eastbound. Beginning at Laramie, Wyo., the western terminus of the fifth subdivision, the distances referred to in the report are as follows: Sherman (the summit about 8,000 ft. above sea level), 25 miles; Buford, 29 miles; Borie, 47 miles; Cheyenne, 66 miles; Hillsdale, 76 miles.

About 11 in. of snow fell between 6 p. m. on the fourth and 6 a. m. on the fifth; the temperature at midnight on the fourth was 28 deg. above zero. Westbound trains from Cheyenne were discontinued at 9:15 p. m. on the fourth and eastbound freights out of Laramie at 9:30 p. m. Train operation was not resumed in either direction (the road is double track) until the afternoon of November 6. All wires were down both east and west of Cheyenne by 8:45 p. m. and east of Cheyenne 17 miles of poles were down.

Trainmen admitted that they lost their bearings in many cases; they passed signals without seeing the indications and in some cases without seeing the posts. Fusees could be seen but a short distance and torpedoes were not heard. Whistle signals were inaudible except at very short distances. There was no evidence of anything wrong in connection with the locomotives, cars or signals.

The first collision was at Hillsdale, at 11:55 p. m. A freight, moving at about six miles an hour, ran into a preceding freight which was stalled in the snow. The report summarizes the evidence about frequent stops; difficulty in flagging and difficulty in seeing signals; but no conclusion is given (except at the end of the report on the three collisions).

The second collision was at Borie, at 12:30 a. m. and the conditions were not much different from those at Hillsdale. The employee killed was a shop foreman, riding in the caboose of the standing train.

In the third collision, at Buford at 1.45 a. m., eastbound mail train No. 6, first section, consisting of 12 baggage, express, and mail cars and one deadhead sleeping car ran into a standing freight, and three employees were killed and one injured. A caboose and six freight cars were demolished and one of the two locomotives of the mail train was overturned. In this case (as in the others) the grade was descending and there was conflicting evidence as to whether the engineman had tried properly to control the speed. A window on the left side of the cab was blown out by the wind, increasing the difficulty of keeping a lookout. The engineman said that most of the time he had his head out of the window, but he did not see either flagman or fusees, and heard no torpedoes. In discussing the claims of the flagmen of the freights, concerning their inability to protect their trains, the inspector calls attention to the fact that the flagman of No. 6 did protect his train, remaining out for a period of four hours.

Conclusions.—The report fills a dozen pages and we can touch only the salient points of the conclusions. The inspector holds that "the usual practices and safeguards were inadequate under these extraordinary conditions; it was impossible to control trains within range of vision at the lowest rate of speed at which it was practicable to operate them. * * * Notwithstanding the adverse conditions, the employees apparently did not realize the gravity of the situation sufficiently to impel them to tie up their trains in accordance with Rule 101-A," which requires this to be done when severe storms make movement unsafe. Other rules are quoted concerning proper procedure in foggy weather and when an automatic signal stands in the stop position.

The report holds that Engineman Kennedy, of No. 6, approached Buford at an unsafe rate of speed. He had exceeded schedule speed apparently all the way from Laramie. He said that he had lost his bearings, but the inspector thinks that on a certain four-degree curve, he ought to have been able to locate himself. At Hillsdale the flagman went back but was unable to attract the attention of the flagman; at Buford and at Borie, the information about flagging is unsatisfactory; at Borie the flagman returned to his train without being recalled.

An automatic train stop would have been useful at Buford, says the report; and the concluding paragraph says that under these circumstances a time interval was entirely ineffective; and that if absolute blocking had been in effect "A greater degree of safety would have been provided. * * * There are times when weather conditions are such that, without an absolute block, trains cannot be operated with safety, and temporary suspension of operation is the only alternative means of preventing collisions."

Front-End Locomotive Throttle Valve

THE CHAMBERS THROTTLE VALVE, manufactured by the Bradford Draft Gear Company, New York, has been applied to a great many modern locomotives as a saturated steam valve located in the dome. This valve has now been redesigned to make it applicable as a front-end throttle, using superheated steam. The new design, which is illustrated in the drawing, differs in a number of details from the earlier types. The connections from the throttle lever to the valve are carried outside the boiler, the throttle rod connecting to an arm on a rotating shaft which enters the throttle box cover through a steam-tight packing. A forked arm secured to the square inner end of the shaft is connected to the valve stem and lifts the pilot valve and the main throttle.

The throttle box has two steam inlets from the superheater header entering from the rear at right angles to each

other and leading to the top of the valve. The outlets to the cylinders are placed on each side at the bottom of the throttle box. This arrangement keeps all the steam pipes entirely inside the front-end. The throttle box is supported by the steam pipes, the joints between the front-end and the throttle box being sealed with a pressed angle. The throttle valve is readily accessible by removing the cover from the throttle box.

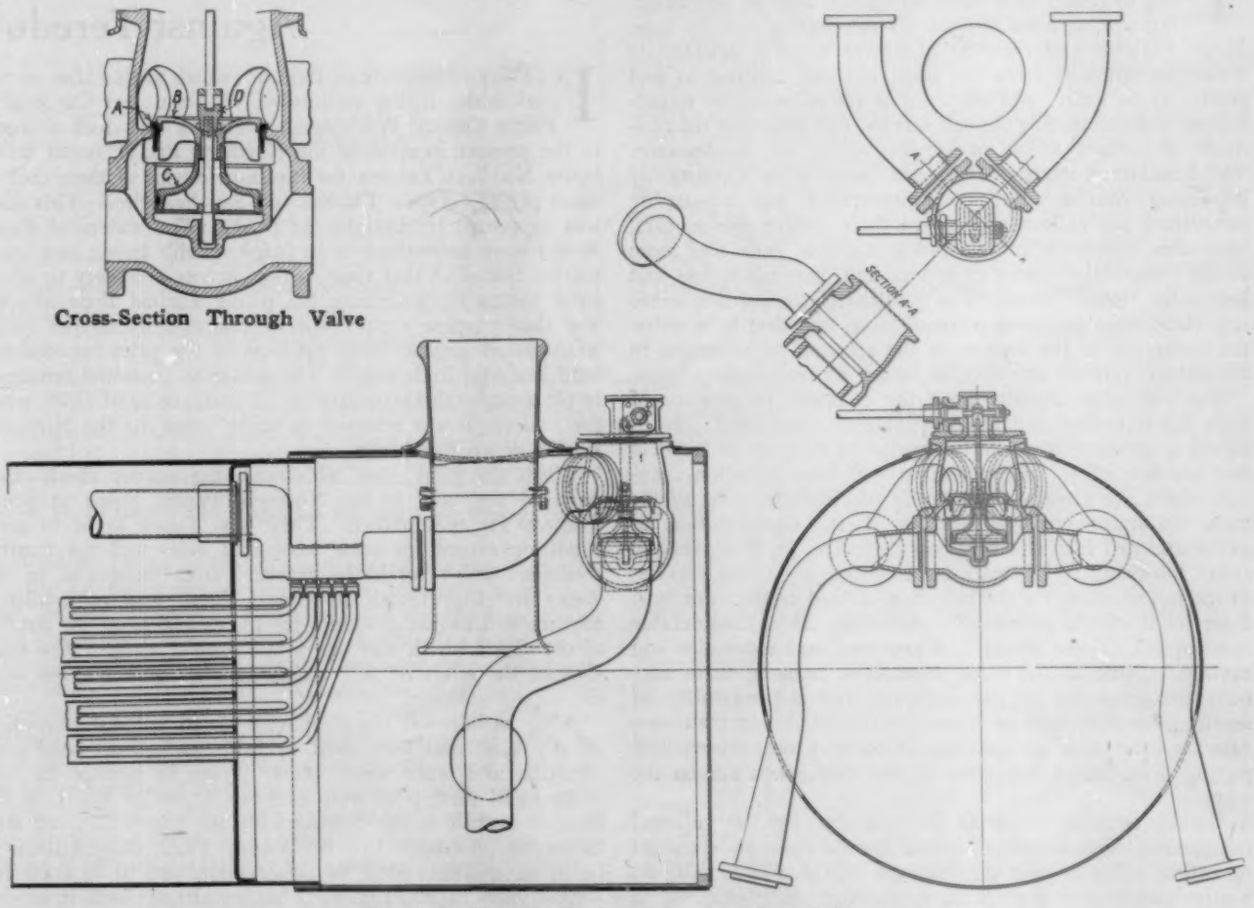
It is a well-known fact that castings when exposed to high temperatures warp and distort. These temperature strains make it difficult to keep throttle valves tight with high pressure steam and especially if it is superheated. The design of the Chambers valve has been worked out carefully to eliminate the effect of these distortions so that the valve will remain tight in spite of warping in the throttle box. The way in which this is accomplished will be evident by an examination of the drawing. It will be noted that the ring seat *A* rests on the throttle box with a flat joint and has a slight clearance in the bore of the box. If the throttle box warps so that the bore is eccentric it still will not affect the tightness of the joints between the box and the ring seat. The main valve *B* rests on a beveled face on the ring seat. When steam is shut off there is no balancing pressure beneath this valve and the force of the boiler pressure acting upon its surface presses it tightly into the ring seat. The ring seat is of relatively light cross section and the force on the main valve is sufficient to cause the seat to conform to the shape of the main valve, thus making a tight joint in spite of any slight distortion in the valve.

The balancing force on the main valve is secured by the action of the balancing piston *C* which is always tight in the balancing chamber and for that reason the valve is not subject to the troubles due to difference in expansion between the valve and the throttle box which are found with double seated throttle valves. Locomotives with superheaters and a throttle in the dome have a considerable volume of steam space between the throttle valve and the cylinders. When the throttle is opened this space must be filled with steam before the locomotive will start and when the throttle is closed this steam continues to expand so that the locomotive does not stop at once. This sluggishness in responding to the movement of the throttle makes it difficult to handle a locomotive especially on a slippery rail. When a locomotive throttle valve is placed in the front-end, the volume of the steam passages between the throttle and the cylinders is decreased, making the locomotive more prompt in responding to the movement of the throttle.

Superheated steam flows at a higher velocity than saturated steam and for these reasons the fine graduation of the throttle valve opening secured with the Chambers valve is of special importance. The first opening of the throttle is through the pilot valve *D* which permits steam to pass through the center of the main valve to the cavity under the balance piston. A slight amount of steam will flow through the relief opening in the balance piston but this is negligible. When the main valve is lifted from its seat, a small annular passage is opened between the valve and the ring seat. The next steam passage to be opened is a series of 24, ¼-in. holes around the valve skirt. Raising the valve still further gradually opens the passage between the wings on the main valve and the ring seat until the full cross-sectional area of the steam passages is attained.

The Bradford Draft Gear Company favors the use of throttle valves located in the front-end because this arrange-

Cross-Section Through Valve



Chambers Throttle Designed for Superheated Steam

ment permits the use of superheated steam in the auxiliaries and enables the steam supply to be taken from a large opening at the topmost point of the dome, thus insuring the driest possible steam, the maximum superheat, and consequently the maximum economy in the use of fuel.

Co-ordination of Motor Transport and Railroads*

By Elisha Lee
Vice-president, Pennsylvania Railroad

THE RAILROAD and the motor vehicle are not rivals seeking to crowd each other out of the field of patronage, but are agencies capable of developing side by side. Motor vehicles and concrete highways are not destined to erase the railroads from the map, but are destined to add greatly to the utility and efficiency of the railroads by rounding out and completing the rail service, and relieving the railroads of certain forms of service which are burdensome. The demands of modern large-scale industry for a constantly increasing volume of mass transportation are irresistibly compelling the railroads to adapt their motive power, cars, structures, terminals and operating methods more and more to the "wholesale" forms of service and, inevitably, less and less to the "retail" forms. The question of competition seems important from only one point of view, and that is to enlist the assistance of the leaders in the automotive industries in discouraging futile attempts at losing forms of competition.

The railroads urgently need the co-operative services of both motor trucks and motor passenger lines, and can ill afford to see these forms of enterprise go to waste in fruitless and needless efforts at competition with transportation agencies which are already functioning successfully. One of the most important opportunities for useful co-ordination of motor and rail facilities may be expected to lie in organizing smooth-working freight pick-up and delivery motor services in the larger cities, for the less than carload traffic. For such a service it will be necessary to enlist the aid of considerable new capital. There would be many very real economies and savings outside of the rates themselves. Among them may be enumerated the greater certainty and dependability of service, the reduction of losses in transit, lower insurance rates, greater ease in making shipping arrangements and paying bills, and a reduction in the time goods are on the way.

Should terminal trucking be operated by the railroad companies? Two important considerations favor independent operation. One is that the railroad business is already so vastly complicated that it is very debatable whether it is desirable to add another department. The other is that, if identified with the railroads in ownership, the trucking operations would be more likely to be subjected to hampering and restrictive regulation than if independent.

Should there be a single trucking agency in each city? That seems to be the general rule in England. For us there seem to be at least some good arguments for preserving a degree of competition and also for maintaining the identity, all the way through, of the services of the separate railroad lines. Store-door delivery has already been introduced in this country, and may fairly be regarded as past the experimental stage.

The speaker went on to show the need and value of hard roads for traffic to feed the railroads, and spoke of the illogical course often pursued, of neglecting this field while spending large sums on spectacular "coast to coast" projects. The most useful field for automobile trucks is in carrying l.c.l. freight between cities and surrounding towns within 25 miles. Railroads now have to make their profit on long-distance traffic, yet the public pursues the unwise policy of permitting the use of passenger and freight trucks for long-distance runs, parallel to the railroads, and often parallel also to an interurban railroad; it allows a third carrier to come in where the two already existing are more than sufficient for the legitimate needs. Of the number of trucks that began during the war to carry freight between New York and Philadelphia, only one is now running. Of the other concerns now in the business all are less than two years old.

*From a paper before the Society of Automotive Engineers at New York City, January 11.

Is Copper a Protection Against Teredo?

IN 1877 THE SOUTHERN PACIFIC, which at that time owned coal mines in the vicinity of Wilkison and Carbonado, Pierce County, Washington, erected a coal dock adjacent to the present location of the Northern Pacific ocean warehouse No. 2 at Tacoma for the transference of their coal to boats plying between Tacoma and San Francisco. This dock was supported by Douglas fir piling. The waters of Puget Sound were understood to be infested with teredo and other marine borers at that time so that it was necessary to adopt some means of protecting the piling against their attacks. For that purpose copper sheets, fastened by copper nails, were placed around those portions of the piles between the mud line and high water. The piling so protected remained in place under this structure for 22 years, or until 1898, when the coal dock was removed to make room for the Northern Pacific ocean warehouse.

When the piles were withdrawn the copper sheets were removed and sent to the Northern Pacific shops at South Tacoma for examination. They were found to be in good condition except for some loose nail holes and the natural corrosion which would be expected from immersion in sea water for that length of time. There was no tendency towards disintegration except for the corrosion on the outside of the sheets which was due to a chemical action. The piles showed the effect of this action as they were covered with the copper solution.

After withdrawal the piles were stored without protection of any kind and were used in false work, bulk-head construction and other work. After laying in storage for two years 44 of these piles were redriven in bridge No. 1 on the Burnett branch of the Northern Pacific where they are still in service. An inspection in October, 1922, showed them to be in an excellent state of preservation and to be good for several years further life, after having already been in service for 44 years.

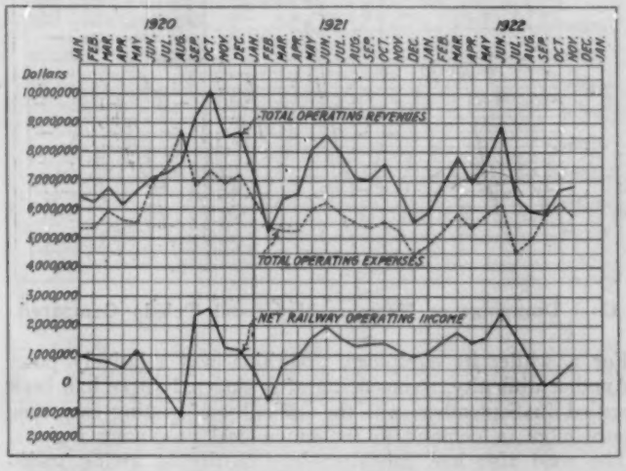
LEGISLATION prohibiting action for personal damages against railroad companies not operating in Minnesota, is being urged by the Governor of that state. A recent examination of the calendars of the district courts in 67 counties, showed that 1,028 personal injury suits are pending in those counties, seeking damages aggregating $28,000,000, all of which are based on claims that arose outside the state.

TWELVE THOUSAND OR MORE persons were killed in the operation of automobiles in the United States in 1922. This total is based on a compilation made by the National Safety Council, which has issued a statement giving the total number of fatalities in each of a number of large cities. The total in New York was more than 800, and Chicago comes next. In 78 large cities (those of 50,000 population or more) 1,347 children were killed.

Chesapeake and Ohio Had Eventful Year in 1922

Favorable Results from Non-Union Coal Traffic Counteracted by Effects of Shop Strike

THE ANNOUNCEMENT that the Van Sweringen brothers of Cleveland were to acquire H. E. Huntington's stock holdings in the Chesapeake & Ohio was interesting enough in itself when it was made a few weeks ago. Almost equally interesting, even if of relatively less importance, have been the reasons advanced to show wherein common control of the Nickel Plate and Chesapeake & Ohio might prove of value, in that it would give the latter a much needed outlet for coal moving to the north and west. The Chesapeake & Ohio has generally been regarded as having



C. & O. Revenues and Expenses for the Last Three Years

good outlets for its traffic both east and west—east, primarily because of its extensive facilities at Newport News; and west, primarily because of its control of the Hocking Valley with the latter's low grade line and extensive terminal facilities on Lake Erie at Toledo. The statements made to the effect that the Chesapeake & Ohio needs additional outlets to the west and north should not serve to minimize the importance and value of the Hocking Valley as an outlet for C. & O. coal. They serve to emphasize rather just how great are the possibilities for future expansion in the coal fields served by the C. & O., particularly in the Logan, Kanawha and Kentucky districts and, similarly, the capacity the Chesapeake & Ohio has available for handling its coal traffic.

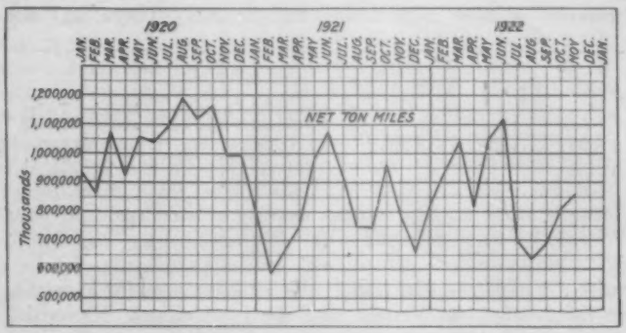
The Hocking Valley Outlet

The Hocking Valley—the C. & O.'s principal outlet to the north and west—is controlled by the C. & O. through majority stock ownership. It is operated somewhat as a division of the C. & O. Speaking generally, coal is assembled on the C. & O. at Russell, Ky. It moves north over the Chesapeake & Ohio Northern, thence by means of trackage rights over the Norfolk & Western between Waverly, Ohio, and Valley Crossing and is delivered to the Hocking Valley at Parsons yard, which is just south of Columbus. The Hocking Valley operates its line between Parsons yard and Toledo as a single freight district. A feature of Hocking Valley operations is the road's heavy average train load, this reflecting among other factors the advantage of favorable grades and a line laid with heavy rail and rock ballasted. The Hocking Valley pier at Toledo is the busiest coal terminal on Lake Erie and its coal dumpings in most years are considerably ahead of those of any other railroad coal dumping facility on the lake. It is interesting to notice, in addition, that the coal dumpings at Toledo compare rather favorably with the coal dumpings at Newport News. There are frequently times when the Hocking Valley pier is working at a higher rate than the busy facilities at Hampton Roads.

It might be added, also, that the Chesapeake & Ohio is using its heavy 70-ton and 100-ton cars in the Toledo service in the same manner as it uses them to Newport News and that speaking generally the Hocking Valley outlet is quite comparable to the outlet to tidewater. All of this indicates just how good an outlet the Hocking Valley is for Chesapeake & Ohio coal. At the hearings in Washington, however, it was brought out that the Chesapeake & Ohio is in a position to supply considerably more coal to the north and west than can be taken care of by the Hocking Valley route to the lake. Considerable attention has been paid to the outlet supplied through Cincinnati. It has been emphasized that the situation at Cincinnati is far from satisfactory and it has been pointed out that the connections at that point are in no position, however much they might want the traffic, to handle it promptly when they are working at capacity.

At an Opportune Time

Nothing was said at the hearing in Washington before Director Mehaffie of the I. C. C. Bureau of Finance about the Chesapeake & Ohio of Indiana, the C. & O.'s own line to Chicago, but it is fairly well known that this part of the C. & O. system is not up to the physical standards of the rest of the system and does not offer an economical route. However, the point was made that the Nickel Plate could offer through Fostoria a very satisfactory outlet for C. & O. coal moving both east and west. Further than that, the Nickel Plate is prepared to spend a considerable sum of money to take care of this traffic properly, provided it is



C. & O. Traffic Shown in Net Ton Miles Including Revenue and Non-Revenue Freight

assured of the permanency of any arrangements that might be made. Of interest in this connection is the placing of an order by the Nickel Plate last week for 30 Mikado locomotives.

In general it would appear that the acquisition of an interest in C. & O. by the Van Sweringens should prove of considerable value to the C. & O. Another point, also not brought out at the hearing, was that the Chesapeake & Ohio has a program for the improvement of yards, terminals, etc., amounting to some $13,000,000. The expenditure of this

much money on the Chesapeake & Ohio lines will naturally bring about a very considerable expansion in the capacity of the railroad. Agreeing then, that the Chesapeake & Ohio needs additional outlets under present conditions and realizing that improvements now under way will increase its capacity and, therefore, accentuate its need for outlets for its traffic, the point can well be made that operation of the Nickel Plate and the C. & O. in one system has come about at an opportune time.

A question of leading importance at this time is as to whether the Van Sweringens have it in mind to extend their control of Chesapeake & Ohio beyond the present idea of having joint directors on the Nickel Plate and C. & O. boards of directors. It is reported that an actual merger of the properties is in contemplation. The Van Sweringens in acquiring control of Chesapeake & Ohio have—because of the C. & O.'s financial strength generally—undoubtedly considerably strengthened their own financial position. A merger of the C. & O. with the other Van Sweringen lines would greatly increase the effectiveness of this assistance and no doubt would further the interests of the properties themselves. Surmise, however, has its limitations in a case of this kind because the merger story is not yet confirmed. Presumably, however, the Van Sweringens—and similarly the Chesapeake & Ohio—are going to continue to be much in the public eye in coming months.

Operating Results in 1922

The Chesapeake & Ohio's operating results during the year 1922 supply a somewhat unusual study in contrasts. During the early part of the year the road experienced some of the best months in its history, whereas later in the year there followed some months that were extremely poor. The change in the road's fortunes took place on July 1, prior to which time the road was moving large volumes of non-union coal and subsequent to which operations were very much disarranged by the severe effects of the shopmen's strike. The good months—of these June was the best with a net operating income of $2,452,539 and an operating ratio of 69.8—resulted from the fact that the Chesapeake & Ohio mines were largely non-union and because these mines operated at nearly record capacity while the union mines in the states to the north were idle because of the strike. The Chesapeake & Ohio coal traffic, as large as it was in this period, did not, however, succeed in breaking any records. There was not quite the expansion in traffic which took place, for example, on the Norfolk & Western and the Louisville & Nashville, the reason being presumably that the Chesapeake & Ohio mines were not entirely non-union—some of the mines in the New River district were inoperative.

Coal Dumpings in Gross Tons

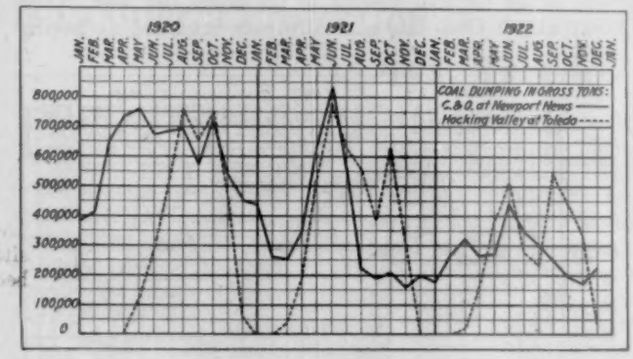
Year	Chesapeake & Ohio at Newport News, Va.	Hocking Valley at Toledo, Ohio
1919	3,436,364	3,924,449
1920	7,264,390	3,592,461
1921	4,312,619	4,056,305
1922	3,427,107	2,977,270

Hocking Valley dumpings at Toledo are reported in net tons. The totals shown above are translated into gross tons for the purpose of this comparison.

Charts reproduced in this article show the traffic in net ton-miles, the gross income, operating expenses and net income for the three years, 1920, 1921 and 1922. With reference to 1922 it will be noted that there was a slight drop in tonnage in April and that even when the traffic movement was at its peak in June neither the ton-miles nor the gross income were up to the levels which were reached in the peak months of 1920. While this movement of non-union coal continued the Chesapeake & Ohio earnings continued to reflect most favorable results. The net operating income for the first six months of the year, for instance, totaled $9,644,657, which was roughly $4,600,000 in excess of the figure for the first six months of 1921.

Severe Effects of Strike

The effect of the shop strike on the Chesapeake & Ohio was extremely severe and was accentuated by a contemporary strike of the clerks. The chart shows the effect on the road's traffic and earnings. In July, the traffic which in June was so much ahead of 1921 declined sharply and in August the net ton-miles were the lowest, with one exception, for any month in three years. The gross income fell in proportion and the net operating income declined so that in September it was shown as a deficit of $74,853. The Chesapeake & Ohio has had a comparatively slow recovery from the situation which was experienced during and after the shopmen's strike.



Coal Dumpings at Newport News and Toledo Compared

For a while, its equipment condition was relatively poor. Another difficulty, commencing after the coal strike had been settled in September, was the difficulty of getting cars now once more in demand in the union coal producing regions. The road also had considerable difficulty in giving traffic to its connections, particularly those serving coal regions of their own.

The effect of the strike was naturally shown most pointedly in the maintenance of equipment expenses. In June, the month before the strike, these totaled $2,119,118, and for the first six months of the year they were $11,251,434, as compared with $10,575,701 in the first six months of 1921. Cessation of work in the shops in July brought the expenses for the month down to $955,417, but in September and October, the two poorest months of the year from this standpoint, the figures had increased to $2,201,066 and $2,538,859, respectively. The railroad started the shop strike with 12.8 per cent of its locomotives held out of service for repairs requiring over 24 hours. On September 15 this percentage had risen to 30.3. This condition has since been gradually remedied; on January 1 the percentage was 18.5. The bad order car percentage has shown a somewhat similar trend. On July 1 it was 15.3 per cent; on August 1 it was 19.3 per cent, and on December 15 it was 13.1 per cent.

The final results for the year show the Chesapeake & Ohio to have come through the year with a net operating income slightly in excess of that for 1921. The net operating income for the whole 12 months was $14,410,330. This compared with $13,660,924 in 1921.

Coal Dumpings at Newport News and Toledo

One of the features recognized as being of leading importance in Chesapeake & Ohio operations is the amount of the coal dumpings at Newport News. The figure in 1922 was only 3,427,107 gross tons, the smallest total which the pier has reported in several years. It is of interest that in every month of 1922 the dumpings by the Virginian exceeded those of the Chesapeake & Ohio. There were, of course,

several reasons for the C. & O.'s small total of dumpings in 1922 of which the effect of the shop strike is one, and another, the increased demand for the Chesapeake & Ohio non-union coal in areas in the interior not securing their regular supplies of fuel during the coal strike. Naturally, under the conditions of 1922, there was very little export trade in coal. In 1920 the Chesapeake & Ohio handed across its Newport News pier 7,264,390 tons of coal, thereby breaking all records at the pier. A very large part of the 1920 business was for export coal. Mines on the Chesapeake & Ohio seemed to be unusually successful in this trade.

An interesting question in connection with Chesapeake & Ohio operations is as to whether this export trade will again reach a large volume. If it does, the Chesapeake & Ohio will be well prepared because it is about to put in at Newport News a new coal pier with automatic trimmers and is planning to spend considerable money for necessary yard facilities to go with it. At present it has a modern steel pier and an old wooden one. It is expected that with two piers of the modern type the road will be in a much better position at Hampton Roads than it is at present. Among other things, it is expected in particular that it will be able to take better care of ships requiring coal for bunkers than it can now with the old wooden pier which is devoted to that purpose.

The statement was made above that the Hocking Valley pier at Toledo handles during the season a tonnage of coal which compares quite favorably with that handled at Newport News. There is shown a chart on which are plotted the dumpings by months at both piers. The feature that stands out is the comparatively short season at Toledo and the favorable manner in which the dumpings at Toledo compare with those at Newport News. The Hocking Valley in the 1922 season dumped at Toledo 3,334,383 net tons which compared with 4,542,844 in 1921. The dumpings in both years were considerably in excess of those for any other railroad pier on the lakes.

"Little Drops of Water, Little Grains of Sand"

Observations of an Unofficial Inspector—Expedients of Trainmen to Avoid Brain Exercise

By Harry W. Forman

LAXITY which you get away with, without detection or discipline, is as criminal as laxity which results in disaster. I was never more deeply impressed with the force of this axiom than after having observed the conduct of passenger train employees on a recent trip covering about 6,000 miles.

Failure on the part of trainmasters, road foremen of engines and others to observe the daily performance of train employees, correct their small transgressions and train them in forming safe habits, is the key fact in railroad discipline. It is this that is primarily responsible for the so-called slight violations of rules or of well understood safe practices which are observable on all sides.

Every railroad officer who has analyzed accidents must have been impressed with the importance, in almost every case, of numerous little things which contributed to the result; and will agree with me that it is the sum total of the little risks and neglects which is responsible for the inevitable disaster. And, most of us must admit, these little violations of rules are often observed without the application of a corrective. In many instances they are excused as of hardly enough importance to make a fuss about. You quiet your conscience, perhaps, with the sophistry that in practical railroading no one should be expected to be on the alert and thoughtful at all times; that rules, like the Ten Commandments, were never formulated with the expectation that they would be literally lived up to at all times.

We know, of course, that this is the height of fatuity. Winking at little things may very truly make one responsible for a collision.

But to my experiences on this trip: Our train waited at a junction point for the branch connection. When ready to proceed, the conductor faced his engineer and moved his closed fist up and down; the engineman then recalled the flagman. The rule examiner happened to be on this train. After the train had got under way he turned to the conductor and inquired, "What signal was that you gave your engineer at C——? I am unable to find it in our Book of Rules." Conductor explained it was one he had invented and had used it often to notify engineer to call in flagman. The examiner replied, "We have an air signal for this purpose. Use it hereafter; the hand signal given by you might not always be so understood. *It is just such little things as these that too often result in serious accidents.*"

On another division, the train was delayed about an hour on account of engine trouble, at a station located just beyond a long, high bridge at the foot of a two-mile grade. The engineman did not signal the flagman to protect the train, nor did the flagman show up at the rear end until the lapse of four minutes. He then sauntered back in a leisurely manner.

While traveling one night in the sleeper next to the rear car of the train, happening to step back to the men's washroom, I noticed the flagman re-charging the battery of his electric lantern by use of the train current. He explained that batteries cost him 50 cents each, and that by use of a plug and cord which he carried with him, he could re-charge these batteries and get 20 hours' more service out of them. Five minutes later, and while running at about 40 miles an hour, the emergency brake was applied and the train stopped within less than its length. This flagman was delayed in getting back because he first had to detach the battery cells and replace them in his lamp. This train had 16 cars.

The next night we passed a fusee burning red, placed about 10 ft. outside the rail on the engineer's side, without stopping, and proceeded, at usual speed, until a stop was made for the station. In this case it is likely the engineers (the train was a double-header) reasoned that since the fusee was found within the switches it would be safe to continue to the station without stopping. If the flagman who had placed the fusee no longer required its observance, he should have extinguished it. In this connection, Mr. Trainmaster, let me ask whether you have ever observed employees using yellow fusees for the purpose of inspecting engines, claiming that a lantern did not afford sufficient light? Have you ever known trains to be stopped for messages or for passengers by use of the train-order signal; or seen telegrams written on the 31 train order form; and what do you think about it?

Is not the misuse of fusees, train order signals and order-forms likely to weaken them for their legitimate uses?

On another road our train left its initial station five minutes late because the inspector failed to remove his flag promptly after train was inspected. Soon after leaving this point our engine developed a hot journal (due, no doubt, to lack of proper inspection) and the train stood at one station 45 minutes cooling and repacking it. The engineman failed to notify the flagman to go back to protect the rear, nor did the flagman show up at the rear while train stood there. The conductor did not see to it that his train was protected, but went forward and stood at the engine instead. When ready to start, the flagman—who was standing at the steps at the forward end of the rear car—gave a proceed signal by the use of a red flag. Every railroad man in America ought to know that a proceed signal should not be given with a red flag or red lamp; that these appliances should be held down low in one hand and the signal to start given by the other hand; that "red" should always be understood to mean "*stop.*"

A casual conversation with the conductor and both brakemen of this train developed that none of the three had heard a certain meeting point whistle, nor had they thought it necessary to be on the alert for it, so that if the engineer should fail to sound the signal they could take such action as might be necessary to insure their train being properly stopped. This crew argued that whistle signals could not well be heard on a passenger train and that such work as picking up diners, etc., must be given first consideration. I had the temerity to suggest to them that in my humble opinion the three most important things to keep in mind were:

(a) Superior trains and train orders.
(b) Meeting point whistles.
(c) Protecting the rear of the train.

and that nothing should be allowed to interfere with these paramount duties.

To further substantiate my contention that collisions are often the result of a combination of little infractions of rules, let me cite a recent actual instance:

A freight train received a 31 order to meet another (extra) freight train at the next station. The conductor sent it to the engineer by the front brakeman. The engineer questioned this brakeman as to whether or not he had read the order. Brakeman replied that he had not, as he was cold and wet; and that he guessed the engineer knew his business. The engineman then offered the order to this brakeman to read, but he declined to take it. He then handed it to his fireman, who read it (not aloud) and returned it.

The order contained two movements, one giving time on a passenger train and the other fixing the meeting point with the freight. Engineman read as much of the "wait" times as concerned him, then placed the order in his pocket. Having failed to read all of the order, the fact that he must meet a train at the next station was unknown to him; and, therefore, the meeting point whistle was not sounded as he approached this station. Failure to sound the restriction whistle was not noticed by any one of the other four members of the crew. The station train-order-signal was at "stop." Engineer called for it and, as it was not cleared, reduced speed to about four miles an hour, passing the office, and a 19 order was handed to the brakeman who was on the engine. This order gave the train additional time on the passenger train. Engineer read it, handed to fireman, and began working steam. Then the fireman reminded him of the meet with an extra at that station. Instead of following the safe course in first stopping the train and then reading the order, the engineer insisted that the fireman was wrong, and proceeded. When he finally discovered that the fireman was right, he was too close to the opposing train to prevent striking it.

Now for the little lapses which led up to this collision, the correction of any one of which might have prevented it: The book of rules on that road provides that all train orders must be shown to firemen and also to brakemen when practicable, who must read them, keep in mind and if necessary remind engineman or conductor of any oversight. Another rule requires the engineman to sound the restriction whistle one mile from the point where a train is to be met, and still another requires brakemen of freight trains to get out on top of their trains approaching meeting points. Had the front brakeman read the order he would have noted failure to sound the restriction whistle and possibly might then have reminded his engineer. Also, he would have known that he must get out on top; or if he remained on the engine, at least he would have been helpful in more vigorously sustaining the fireman in his warning that a meeting point was being overlooked. The conductor, rear brakeman and fireman paid no attention to the matter of sounding the meeting point whistle, apparently regarding its omission as of slight importance. In fact the conductor continued writing at his desk in the caboose, not even seeing to it that the rear brakeman got out on top of the train to assist in passing signals as might be necessary.

Will anyone contend that derelictions of these various kinds had not been habitual with these men for months? Who is responsible for such a condition?

Now let us pay our respects to the train dispatcher. The very nature of his calling requires him to be a man of more than ordinary intelligence and he certainly knows that his responsibilities do not begin and end with issuing train orders. If, when the above mentioned train "called for the board" and he was asked by the operator whether or not the train should be cleared on Order No. —, this dispatcher had had the forethought (as he should have had) to say to the operator, "They meet Extra — there. If the extra is not in the clear let them stop for the order, as they must stop anyway"—unquestionably this collision would have been averted.

If records are faithfully kept and carefully studied, any operating officer who has had five years' experience as such, can predict very definitely, by analyzing such data, whether or not his road is likely to have a serious collision soon. When a conductor or engineer is becoming careless—slipping—his record will invariably show it. Oversights, such as failing to read train orders carefully before acting on them, overlooking trains, being neglectful in flagging and in seeing that all men are in their proper places on trains, do not become habitual all of a sudden—the lapses show up one by one. If all such cases of neglect of duty were attended to promptly by the officers, there would be many less collisions.

To form safe habits is the all-important thing in railroading. Those officers who carry out their duty of seeing that their employees always do the right and safe thing from habit are the ones who in time become strong leaders.

In administering discipline, two fundamentals should be kept in mind always: Be satisfied to discipline only the man, or men, who disobeyed the rules, and apply the discipline according to the merits of the case regardless of whether or not a collision resulted; also regardless of whether some long-standing bad habit had been winked at by officers repeatedly in the past.

To discharge every member of a crew because their train collided with another, and then set about drastically checking up men for a few weeks thereafter, is irrational and engenders much ill-feeling—which cannot be called unjustified. Keep everlastingly on the alert for violations, and in this manner *prevent* collisions.

THE STUDY OF TIME TABLES and guides has been made a part of high school work in Benton, Ill., the innovation being introduced at the request of the Commercial Club of Benton. The students will devote one hour a week to this study.

General News Department

The Railway Accounting Officers' Association will hold its next annual meeting on June 13 at Richmond, Va.

W. G. Lee, president of the Brotherhood of Railroad Trainmen, will address the Western Railway Club at its regular monthly meeting on February 19 at the Auditorium hotel, Chicago.

The St. Louis-Southwestern has signed wage agreements with the Association of Metal Crafts, which is an association of the railroad's employees and has no connection with the national shop craft organizations.

The Erie Railroad car shops at Buffalo, N. Y., are now operated by the company. For about a year past they have been operated under contract by William H. Fitzpatrick, but reverted on January 30 to railroad management, in compliance with the ruling of the Railroad Labor Board. About 1,200 men have been employed by Mr. Fitzpatrick.

The Society of Terminal Engineers will hold a meeting on Tuesday evening, February 13, in the United Engineering Building, 29 West 39th street, New York city, to discuss the handling of fruits and vegetables through the terminals at the port of New York. The speakers will be Walter P. Hedden, Department of Agriculture; R. S. MacCormack, representing the Committee on Transport and Terminals, of the Fruit and Produce Trade, and H. C. Snyder, of the Erie Railroad.

The Railway & Locomotive Historical Society, 152 Harvard street, Brookline, Mass., has issued its fourth pamphlet, Bulletin No. 4, describing old stations in Boston, old locomotives of the Boston & Maine and other New England things, and "the first iron passenger cars." Two of these cars were built in 1860 by B. J. LaMothe of New York city, one for the Boston & Worcester, now a part of the Boston & Albany, and one for the Hackensack & New York, now a part of the Erie system. These cars were of sheet metal, even the floor system consisting of thin bands, stiffened with timber.

Foreign Trade Convention Date Changed

The tenth National Foreign Trade Convention will meet in New Orleans on May 2, 3 and 4, according to an announcement issued by O. K. Davis, secretary of the National Foreign Trade Council.

Agenda for Meeting of the International Chamber of Commerce

Three general subjects will be discussed at the second general meeting of the International Chamber of Commerce to be held at Rome, Italy, on March 18 to 24, viz. finance, industry and trade and transportation. Under the last head, maritime, air and rail transportation will be discussed.

American delegates will leave New York on February 10. Their itinerary includes a tour of the Mediterranean before going to Rome.

A Correction

In the report of the recent convention of the American Wood Preservers' Association which was published on page 333 of the issue of February 3, the statement was made that the association had authorized the appointment of a committee to investigate the possibilities of using a mixture of creosote and coal tar as a measure of relief from the shortage of creosote. This was in error to the extent that the committee was appointed to investigate the possibilities of using a mixture of creosote and crude oil instead of coal tar.

Orient Seeks to Restrain Santa Fe

W. T. Kemper, receiver for the Kansas City, Mexico & Orient, has filed a petition in the Federal court at Wichita, Kan., asking a restraining order against the Atchison, Topeka & Santa Fe, which is constructing a cut-off between cottonwood Falls, Kan., and Eldorado. The petition alleges that the Santa Fe line follows the right-of-way of the Orient so closely as to render the latter's property valueless. The Orient has never constructed track on this right-of-way. The petition asserts that the construction of the Santa Fe line was begun with the knowledge that it crossed and re-crossed the Orient property.

Oregon's Need for New Railways

Senator McNary, of the legislature of Oregon, has presented a memorial which he desires to have sent to Washington, asking the Interstate Commerce Commission to have in mind the needs of the state of Oregon for further railroad development in its disposal of the properties of the Central Pacific. It was referred to the committee on interstate commerce. The proposed memorial states that it is essential to the growth and development of the state that the Natron cut-off be constructed as well as an east and west line from Crane, Oregon, to a point west of the Cascades. It asks that the commission act only after a full inquiry into the needs of railroad development in the state.

Group Life Insurance on the New Haven

Life insurance for 7,000 employees has been arranged for by the New York, New Haven & Hartford according to an announcement made on Tuesday of this week. This insurance, to be paid for partly by the railroad company, is provided for the benefit of employees in the mechanical and electrical transmission and communication departments. Individuals have the option of including accident and health insurance. The cost to each employee will be 60 cents a month for $1,000 of life insurance and 70 cents a month for accident and health insurance. The Aetna Life Insurance Company will issue the policies. The action of this company, in providing group insurance at a low rate for subordinate officers, was noticed in the *Railway Age* of September 16.

Heavier Loading Decreases Car Shortage

If the average load per car which prevailed during 1920 and 1921 had been continued through 1922, a saving of 132,440 cars would have resulted in the first quarter and 486,206 cars in the second quarter of that year. The American Railway Association, which is conducting a campaign for the heavier loading of cars, cites the results obtained by the cement industry. The average load of cement 10 years ago ranged from 150 to 160 bbl. or from 57,000 to 60,800 lb. The minimum weight of 50,000 lb. generally applied and permitted the shipment of as low as 132 bbl. Many cars were ordered for that quantity. Since then the cement industry has practically standardized the shipment into three classes of cars as follows:

173 barrels—65,740 lb. in a 30-ton car.
231 barrels—87,780 lb. in a 40-ton car.
289 barrels—109,820 lb. in a 50-ton car.

In 1921 about 96,000,000 bbl. of cement were shipped in this country, which, if averaged at 200 bbl. per car, would have taken 480,000 cars to transport. Without an increase in the average load over that of 1911, 23 per cent or approximately 110,000 more cars would have been required.

One cement company, during the month of July, 1922, shipped 768 cars containing a total of 67,596,744 lb. of cement, which averaged 88,017 lb. per car. The total capacity of the cars, that is the marked capacity plus 10 per cent, was 68,937,000 lbs.,

which indicates that the cars contained 98.6 per cent of their total capacity.

The success of the American Railway Association's campaign for heavier loading of cars has prompted the association to extend its efforts toward the stabilizing of box car demand for cement shipments throughout the year. Statistics prepared by the United States Geological Survey, based mainly on reports of producers of Portland cement, show that shipments of cement are greatest during the months of June, July, August, September and October and least during the months of January and February. By making the shipments uniform throughout the year the association hopes to relieve the car shortage during the latter months of the year.

Factions in Outlaw Union Continue Fight

Attorneys representing R. C. Greenley, A. A. Roe, George Eckroth, the American Federation of Railway Workers and the Amalgamated Railroad Workers on January 25 filed a cross bill in contravention of the injunction obtained on January 20 by representatives of Fred S. Galloway, general secretary-treasurer of the United Association of Railway Employees of North America.

Last week's order restrained and enjoined Greenley and his association from "disposing of or transferring or assigning any and all moneys in their possession belonging to the United Association of Railway Employees of North America." The Madison & Kedzie State Bank, depository of the union's funds, was made a party to the order, which followed months of interior dissension and strife among the members of the organization, an outgrowth of the Chicago Yardsmen's Association, which in 1920 staged the "outlaw" strike.

A meeting in Chicago on January 25 of representatives of the union's principal locals brought the adoption of resolutions approving the stand of Galloway in his fight to retain control of his office.

"The situation that exists is no more or less than a persistent effort on the part of the conservatives in our organization to make of the union a clean and orderly body of railway workers," Galloway said. "We don't intend to countenance unfair dealing of any sort and will fight to the last ditch for our rights and the future of our organization."

Labor Board Defers Decision on Disputes With Train Service Employees

The Railroad Labor Board in a decision announced on February 6 postponed the rendering of a decision in the remaining unsettled disputes between a few carriers and their train service employees. The hearings in these disputes were begun on January 15 and the testimony presented and the carriers and organizations involved were reported in the *Railway Age* of January 20, page 248.

The Board held in its decision that it "is of the opinion that it would be a disturbing factor in the present railway labor situation under the circumstances above detailed, to establish rates and conditions on a few roads for train, engine and yard service at variance with those prevailing on more than 95 per cent of the railway mileage of the country."

"On the other hand," the ruling adds, "the right of each carrier to act upon its own initiative in the submission of such a dispute is recognized by the Board. It is therefore the judgment of the Board that it is to the best interest of all concerned that a decision of these disputes upon their merits should not be rendered at this time, but that the cases should not be dismissed. Holding them on the docket will give both parties the benefit of all the evidence they have respectively filed, which could be supplemented by additional evidence, if desired by either party and deemed advisable by the Board.

"The action of the Board here taken must not be construed in any manner or degree, to indicate its position one way or the other upon the merits of the questions at issue, or in any sense, as an invitation to other carriers to join in these disputes.

"It is, therefore, decided that the disputes between the carriers and organizations named herein shall be held on the docket of the Board until some date subsequent to October 1, 1923, when they will be taken up for further consideration and decision, unless, in the meantime, agreements have been reached."

National Chamber of Commerce to Discuss Transportation

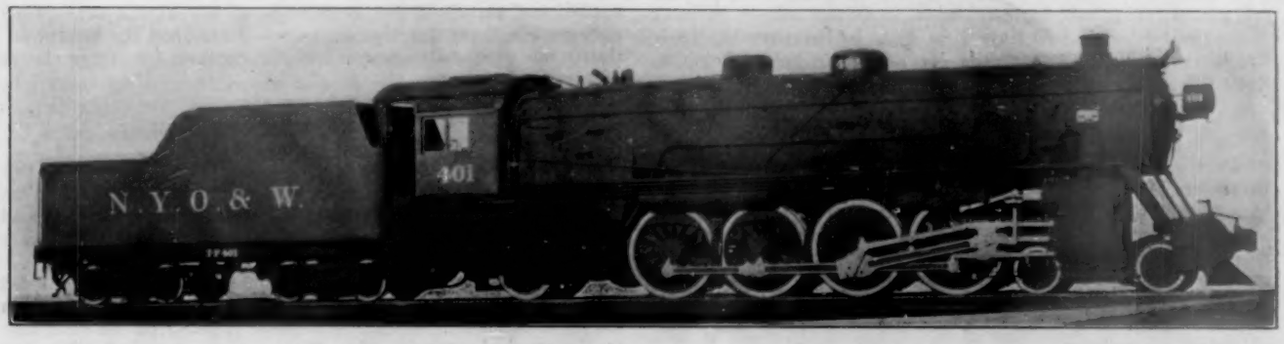
American transportation in all its phases will be one of two principal subjects for discussion at the annual meeting of the Chamber of Commerce of the United States to be held in New York on May 7-10.

On the mornings of May 8, 9 and 10, and on the afternoon of May 10, there will be general sessions devoted to this subject. The different phases of the subject to be considered at these sessions are not yet definitely determined upon and may include:

The Railroad Rate Structure.
The Public Interest and the Right to Strike.
Transportation Problems in England.
Developing a National System of Rail, Water and Highway Transportation.
Co-operation Between Waterway and Railroad Transportation.
Co-ordination Between Motor Truck and Railroad Transportation.
Co-ordination of Railroads, Waterways and Highways.
The Farmers' Interest in Transportation.
Financial Support for the Railroads.
Establishment of Railroad Credit.
The Government and the Railroads.

On the evening of May 8, a general session will be devoted to European Conditions from the American Viewpoint. The subjects to be considered at this session have not yet been determined. The chamber says further:

"It will be appreciated that we are just beginning to shape up the program, consequently the subjects mentioned are yet tentative except those around which the meeting will be centered, that is, transportation in all its phases in the United States, and European conditions from the American viewpoint. The questions to be considered, however, at the meeting will be approached in their relation to the general subjects and considered from that point of view."



Mountain Type Passenger Locomotive for the New York, Ontario & Western, Built by the American Locomotive Company

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1922

Name of road.		Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1921.
						Maintenance of									
			Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Akron, Canton & Youngstown	Dec.	170	$186,824	$1,050	$198,836	$30,444	$31,313	$7,034	$63,513	$8,524	$140,828	70.80	$58,008	$47,007	$23,152	$14,980
	12 mos.	170	2,090,628	14,895	2,209,489	279,247	248,406	71,969	644,097	101,092	1,344,398	60.80	865,091	742,349	428,448	202,105
Alabama & Vicksburg	Dec.	141	212,812	71,680	303,506	70,589	55,590	8,034	97,574	11,174	244,227	80.50	59,279	35,092	43,743	27,395
	12 mos.	141	2,148,854	699,737	3,063,635	584,742	604,115	97,825	1,153,686	140,993	2,604,018	85.00	459,617	224,148	286,393	255,329
Vicks., Shreveport & Pacific	Dec.	171	228,707	116,704	373,655	56,835	52,534	9,550	121,514	13,284	255,710	58.40	117,945	91,598	85,586	72,630
	12 mos.	171	2,326,927	1,112,717	3,717,970	631,902	655,579	118,101	1,421,490	161,567	3,016,260	81.10	701,710	468,616	368,823	459,948
Ann Arbor	Dec.	293	365,572	45,971	432,983	50,989	131,342	9,682	198,099	18,493	408,246	94.30	24,737	2,297	40,287	58,210
	12 mos.	293	4,305,008	509,843	5,053,161	615,525	971,940	111,591	2,225,249	195,260	4,119,391	81.50	933,770	672,719	426,862	490,382
Atchison, Topeka & Santa Fe	Dec.	8,864	13,418,722	3,977,406	19,091,741	2,379,788	3,800,262	318,359	6,341,470	335,254	13,056,841	68.40	6,034,900	4,057,437	4,144,616	1,798,809
	12 mos.	8,857	132,964,660	42,469,165	191,506,230	29,978,744	43,288,399	3,248,844	60,232,717	3,941,025	140,356,508	73.30	51,149,722	34,062,108	35,509,010	46,234,261
Gulf, Colo. & Santa Fe	Dec.	1,908	2,141,562	412,637	2,690,963	210,964	445,597	51,445	805,919	68,201	1,569,879	58.30	1,121,084	1,028,386	959,703	—847
	12 mos.	1,907	18,686,643	4,159,369	24,392,120	4,057,902	5,383,281	527,386	7,767,358	805,488	18,513,132	75.90	5,878,988	4,954,460	4,192,458	6,339,396
Panhandle & Santa Fe	Dec.	857	622,764	138,061	801,755	94,799	166,915	9,360	244,424	17,661	530,500	66.20	271,255	202,776	159,915	—98,586
	12 mos.	857	6,188,670	1,429,368	8,119,141	1,921,800	2,294,145	88,087	2,613,461	223,123	7,126,996	87.80	992,145	637,974	236,615	1,877,411
Atlanta & West Point	Dec.	93	144,517	85,793	242,064	42,809	39,197	8,254	87,789	12,824	194,025	80.10	48,039	29,249	13,612	8,740
	12 mos.	93	1,410,221	877,769	2,606,416	353,148	521,820	96,087	970,135	125,951	2,109,885	80.90	496,531	341,139	230,690	130,623
Western of Alabama	Dec.	133	161,593	82,561	253,687	56,065	44,804	8,898	82,004	14,369	208,900	82.30	44,787	14,772	6,010	—3,833
	12 mos.	133	1,656,679	815,260	2,741,539	360,978	550,787	102,557	875,727	131,334	2,057,939	75.00	683,600	507,615	492,853	222,010
Atlanta, Birm. & Atlantic	Dec.	639	305,192	61,971	391,850	56,416	110,901	21,344	195,804	15,228	399,701	102.00	—7,851	—12,715	—9,679	—174,901
	12 mos.	639	3,199,584	508,622	4,017,228	719,431	1,068,350	254,805	2,005,918	187,746	4,237,134	105.40	—219,906	—379,661	—460,653	—1,774,150
Atlantic Coast Line	Dec.	4,860	4,832,309	1,664,299	7,077,193	866,992	1,346,645	114,088	2,494,842	148,926	5,011,446	70.80	2,065,747	1,258,583	1,232,292	732,177
	12 mos.	4,852	48,857,859	15,871,367	70,823,346	8,434,956	14,297,180	1,276,123	26,018,262	1,649,686	52,033,448	73.50	18,789,898	14,433,025	14,416,370	5,039,567
Charleston & Western Carolina	Dec.	342	207,406	46,465	267,406	34,700	52,211	7,196	100,744	7,017	201,868	75.50	65,538	54,899	43,466	—44,196
	12 mos.	342	2,575,789	465,745	3,221,243	494,085	500,035	80,537	1,315,472	80,357	2,470,486	76.70	750,757	618,155	517,107	—275,642
Baltimore & Ohio	Dec.	5,235	17,019,282	2,461,972	20,949,106	2,019,292	4,263,012	297,196	8,073,242	466,748	15,240,599	72.80	5,708,507	5,619,333	5,138,556	1,653,252
	12 mos.	5,235	159,506,625	26,801,742	200,843,170	23,325,887	48,439,423	3,560,796	82,408,879	5,658,982	165,021,375	82.20	35,821,795	28,966,881	23,735,006	21,853,547
Balti. & Ohio Chic. Term	Dec.	91	.....	.....	269,316	20,746	38,431	1,683	181,271	9,269	255,928	95.00	13,388	—39,497	24,464	—112,446
	12 mos.	91	.....	.....	3,116,202	402,400	445,794	22,159	1,801,475	122,377	2,849,559	91.40	266,643	—325,835	945,835	450,197
Staten Isl. Rapid Transit	Dec.	23	91,037	85,687	193,649	14,703	32,674	1,568	108,662	17,710	176,317	91.00	17,332	—9,251	—24,567	—51,804
	12 mos.	23	918,601	1,210,702	2,422,259	569,892	403,022	23,618	1,413,571	166,780	2,576,883	106.40	—154,624	—381,204	—350,342	—366,734
Bangor & Aroostook	Dec.	616	400,237	80,055	507,674	31,514	247,519	4,562	188,668	23,014	496,799	97.90	10,875	—18,465	16,006	199,251
	12 mos.	623	6,252,789	987,557	7,436,968	1,399,771	1,620,212	49,452	2,179,790	234,503	5,501,677	74.00	1,935,291	1,397,596	1,656,892	1,215,764
Belt Ry. of Chicago	Dec.	32	.....	.....	594,121	54,562	69,262	2,245	277,880	9,390	413,339	69.60	180,782	147,193	116,506	129,789
	12 mos.	32	.....	.....	6,184,668	575,660	610,611	26,299	2,747,520	133,164	4,093,254	66.20	2,091,413	1,673,817	1,652,489	1,599,985
Bessemer & Lake Erie	Dec.	228	1,054,942	34,414	1,116,657	84,734	331,850	14,459	375,283	30,785	843,672	75.60	272,985	138,155	397,564	282,656
	12 mos.	225	13,847,967	383,062	14,511,803	1,323,973	3,839,839	178,795	4,350,486	316,257	10,079,595	69.50	4,432,208	3,873,122	4,809,526	2,279,367
Boston & Maine	Dec.	2,287	4,045,783	1,931,638	6,793,630	728,146	1,656,795	53,667	3,315,383	108,557	5,889,690	86.70	903,940	698,699	232,302	321,044
	12 mos.	2,287	48,316,267	22,556,855	79,800,123	11,076,742	16,112,965	659,242	36,445,903	2,427,789	67,054,397	84.00	12,745,726	10,159,955	6,475,740	—588,367
Brooklyn East. Dist. Term	Dec.	9	113,083	.....	122,875	5,324	8,395	100	48,712	4,671	67,202	54.70	55,673	20,960	20,960	27,505
	12 mos.	9	1,475,357	.....	1,573,325	67,194	194,803	2,368	596,777	56,157	917,299	58.30	656,026	550,927	550,927	325,966
Buffalo & Susquehanna	Dec.	253	229,978	6,122	240,620	21,266	74,210	2,289	83,474	14,622	195,861	81.40	44,759	37,987	93,891	22,040
	12 mos.	253	1,563,031	64,702	1,675,822	384,298	546,515	25,623	607,380	112,320	1,676,136	100.00	—314	—61,669	259,935	70,037
Buffalo, Rochester & Pittsburgh	Dec.	589	1,864,512	166,358	2,098,487	180,187	818,220	25,639	776,295	41,137	1,841,399	87.70	257,088	235,946	305,846	157,140
	12 mos.	589	14,376,684	1,652,354	16,756,681	2,391,382	6,504,441	237,250	6,722,824	474,373	16,343,726	97.50	412,955	41,692	550,680	735,691
Canadian Pacific (Lines in Me.)	Dec.	233	267,320	44,382	329,086	26,809	56,369	4,683	160,256	3,777	251,894	76.60	77,192	66,963	51,680	43,723
	12 mos.	233	2,066,311	402,148	2,658,610	402,367	522,642	53,146	1,315,093	44,952	2,338,200	88.00	320,410	140,181	25,403	—136,889
Carolina, Clinchfield & Ohio	Dec.	309	587,593	48,159	648,997	63,867	168,319	22,523	201,200	20,449	476,174	73.40	172,823	112,823	172,283	225,189
	12 mos.	299	6,973,043	482,369	7,608,602	890,359	1,621,632	263,707	2,011,720	231,823	5,015,787	65.90	2,592,815	2,027,036	2,864,428	2,492,298
Central of Georgia	Dec.	1,920	1,453,909	524,570	2,184,168	240,517	430,615	63,042	860,034	79,893	1,678,160	76.80	506,008	388,538	416,568	6,346
	12 mos.	1,919	15,863,478	5,132,159	23,263,021	2,983,857	4,389,661	777,175	8,824,396	895,265	17,941,396	77.10	5,321,625	4,084,809	4,375,578	1,220,655
Central of New Jersey	Dec.	691	3,501,178	758,721	4,585,612	450,191	1,415,612	32,439	2,205,200	148,993	4,271,828	93.20	313,784	—180,050	—239,637	—76,469
	12 mos.	691	36,517,863	9,535,483	49,488,471	5,530,944	12,973,254	409,849	21,781,282	1,286,971	42,197,422	85.30	7,291,049	3,718,391	3,375,154	5,998,782
Central Vermont	Dec.	532	595,000	93,200	758,781	67,224	38,775	10,315	464,992	19,501	601,706	79.30	157,075	126,830	27,371	71,609
	12 mos.	532	5,677,849	1,207,452	7,626,626	1,045,331	1,092,053	150,455	3,949,302	266,182	6,520,101	85.50	1,106,525	881,374	400,775	—645,928
Chesapeake & Ohio	Dec.	2,550	6,148,065	959,057	7,511,792	1,135,734	2,040,419	80,627	2,249,927	183,468	5,719,222	76.10	1,792,570	1,432,914	1,387,818	1,463,377
	12 mos.	2,549	68,671,906	10,586,625	83,511,562	10,558,139	22,530,748	942,914	29,831,398	1,953,360	66,118,032	79.20	17,393,530	14,081,125	14,410,330	13,660,924
Chicago & Alton	Dec.	1,050	1,990,682	600,104	2,881,988	278,713	67,772	62,182	1,087,834	57,201	1,575,403	54.70	1,306,585	1,166,088	979,591	354,182
	12 mos.	1,050	19,031,174	6,068,799	27,593,925	3,700,886	7,178,553	666,717	11,263,612	687,010	23,647,590	85.70	3,946,335	2,974,368	1,532,189	2,134,004
Chicago & Eastern Illinois	Dec.	945	1,882,149	441,513	2,523,000	210,649	630,721	41,042	1,004,666	72,678	1,971,828	78.20	551,172	434,774	494,441	108,608
	12 mos.	945	18,257,139	4,580,655	24,731,348	2,782,201	6,567,570	508,835	10,354,312	792,109	21,134,733	85.50	3,596,615	2,435,876	2,721,469	2,153,582
Chicago & North Western	Dec.	8,403	8,056,678	2,542,749	11,990,925	1,417,347	2,848,747	151,375	5,402,244	324,982	10,217,205	85.20	1,773,720	1,020,722	1,165,161	—509,787
	12 mos.	8,403	100,700,614	29,177,834	146,100,437	19,323,883	30,456,070	1,818,545	63,056,718	3,744,526	119,191,134	81.60	26,909,303	17,877,373	17,036,305	6,651,137
Chicago, Burlington & Quincy	Dec.	9,393	10,891,922	2,415,406	15,061,251	1,411,951	3,707,558	201,086	5,130,876	383,128	10,922,806	72.50	4,138,445	3,282,712	3,067,405	2,449,286
	12 mos.	9,393	121,388,901	28,380,104	164,916,470	20,769,379	35,735,414	2,267,367	62,875,593	4,277,202	126,777,703	76.90	38,138,767	27,217,422	25,152,173	29,145,007
Chicago Great Western	Dec.	1,496	1,533,428	397,612	2,148,750	161,426	409,500	58,176	946,404	60,398	1,650,143	76.80	498,607	393,053	284,482	—336,594
	12 mos.	1,496	17,730,271	4,343,267	24,224,788	3,640,961	5,705,835	761,049	10,334,248	668,667	21,274,235	87.80	2,950,553	1,961,900	265,183	812,681
Chicago, Milwaukee & St. Paul	Dec.	11,025	10,301,052	2,202,475	13,966,658	1,225,181	3,944,432	177,521	6,068,743	304,372	11,780,587	84.30	2,186,071	1,390,454	1,160,253	30,290
	12 mos.	11,029	116,005,731	24,261,499	156,950,628	19,798,385	36,987,240	2,231,245	66,068,028	3,754,239	129,596,696	82.60	27,353,932	17,692,660	13,284,245	5,117,329

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1921.
Chicago, Peoria & St. Louis	Dec.	246	$140,548	$18,305	$170,005	$12,885	$38,428	$3,554	$93,780	$9,817	$158,464	93.20	$11,541	$512	—$24,340	—$169,728
	12 mos.	246	1,751,302	213,165	2,098,584	319,346	431,677	51,101	1,217,366	124,734	2,144,224	102.20	—45,640	—165,568	—447,083	—690,969
Chicago River & Indiana	Dec.	38	.....	.....	589,143	69,816	90,710	943	244,820	11,258	417,547	70.90	171,596	138,295	218,452	.....
	12 mos.	38	.....	.....	4,299,810	442,167	509,418	6,144	1,693,113	71,587	2,722,429	63.30	1,577,381	1,267,362	1,892,035	.....
Chicago, Rock Isl. & Pacific	Dec.	7,635	6,800,763	2,326,333	10,006,036	1,197,985	2,354,955	186,917	4,265,367	255,164	8,317,497	83.10	1,688,539	1,543,031	1,328,356	1,350,697
	12 mos.	7,655	83,241,761	26,722,778	119,204,558	14,845,840	25,190,699	2,140,257	50,164,827	2,817,846	95,760,795	80.30	23,443,763	17,407,485	13,934,471	15,198,454
Chic., Rock Isl. & Gulf	Dec.	461	434,555	73,036	551,133	56,083	107,747	12,758	267,407	15,126	460,438	83.50	90,695	78,041	64,127	—44,581
	12 mos.	461	4,476,579	927,355	5,881,674	855,302	913,221	158,974	2,707,082	166,974	4,810,129	81.80	1,071,545	922,860	722,101	1,235,423
Chic., St. Paul, Minn. & Omaha	Dec.	1,749	1,625,841	569,717	2,375,828	169,827	413,774	40,225	981,650	68 821	1,682,967	70.80	692,861	615,615	706,017	331,613
	12 mos.	1,749	19,602,694	6,110,337	27,801,007	3,526,299	5,011,252	409,486	12,390,761	849,811	22,297,051	80.20	5,503,956	3,944,933	3,812,671	1,842,852
Cin., Indianapolis & Western	Dec.	347	321,543	49,711	406,503	32,835	91,272	10,598	188,753	19,553	344,683	84.80	61,820	43,087	846	—692
	12 mos.	347	3,547,571	547,498	4,363,694	532,084	960,011	131,075	1,890,305	237,968	3,774,696	86.50	588,998	390,253	59,779	—728,403
Colorado & Southern	Dec.	1,099	974,658	163,086	1,245,200	157,447	386,385	12,389	486,041	44,388	1,100,219	88.40	144,981	44,189	22,102	34,394
	12 mos.	1,099	10,121,548	2,032,090	13,196,236	1,966,385	3,090,818	157,518	5,038,957	522,214	10,894,665	82.60	2,301,571	1,468,057	1,061,877	1,903,795
Ft. Worth & Denver City	Dec.	456	673,046	190,911	913,211	74,701	247,986	10,911	294,680	32,914	665,249	72.80	247,962	218,017	222,965	169,357
	12 mos.	456	6,852,575	2,266,751	9,717,037	859,455	2,124,648	136,182	3,124,086	417,218	6,725,890	69.20	2,991,147	2,474,289	2,360,249	3,457,112
Wichita Valley	Dec.	256	156,487	25,130	189,900	19,598	15,943	10	54,121	1,438	91,079	48.00	98,821	94,970	77,636	22,607
	12 mos.	256	1,045,075	278,036	1,415,488	243,407	124,819	448	553,977	17,272	936,304	66.10	479,184	400,344	231,652	414,403
Columbus & Greenville	Dec.	167	101,178	51,862	161,742	31,117	17,498	3,246	46,517	8,872	107,250	66.30	54,492	50,456	37,888	—8,979
	12 mos.	191	1,126,310	376,088	1,581,751	353,116	154,504	38,193	556,769	102,851	1,205,380	76.20	376,371	319,669	188,942	—389,464
Delaware & Hudson	Dec.	886	2,950,420	294,299	3,432,888	304,463	1,194,583	41,908	1,681,760	145,653	3,387,674	98.70	45,214	123,111	74,892	153,771
	12 mos.	887	30,792,874	3,784,202	37,722,123	5,108,502	11,568,258	525,122	16,017,181	1,771,867	35,485,397	94.10	2,236,726	1,361,367	1,216,669	7,076,803
Dela., Lackawanna & Western	Dec.	994	4,733,217	1,201,875	6,761,151	590,714	1,963,776	101,142	3,297,672	161,317	6,171,413	91.30	589,738	204,290	329,139	—73,349
	12 mos.	994	51,630,919	14,039,801	74,873,605	7,984,643	18,753,435	1,357,743	33,525,065	1,883,370	64,145,813	85.70	10,727,792	5,797,588	6,669,022	12,997,084
Denver & Salt Lake	Dec.	255	146,388	15,814	172,999	29,199	86,051	1,028	73,521	6,145	195,944	113.30	—22,945	—26,769	—28,908	46,225
	12 mos.	255	1,262,677	209,522	1,580,509	510,231	449,023	11,715	562,395	71,583	1,654,917	104.70	—74,408	—177,277	—151,463	32,871
Detroit & Mackinac	Dec.	385	80,591	33,352	136,192	25,274	39,390	1,966	61,544	7,059	135,120	103.70	—4,928	—14,940	—8,173	2,601
	12 mos.	385	1,364,806	353,050	1,875,664	309,352	584,697	25,867	708,686	70,027	1,697,425	90.40	178,239	57,599	57,158	65,571
Detroit & Toledo Shore Line	Dec.	61	319,198	.....	323,105	32,373	33,052	2,243	120,096	10,096	197,860	61.20	125,245	97,949	14,577	—77,862
	12 mos.	61	3,547,380	.....	3,585,716	343,491	290,107	27,629	1,070,618	87,276	1,819,121	50.70	1,766,595	1,546,239	145,006	337,575
Detroit, Toledo & Ironton	Dec.	454	728,345	12,806	761,611	92,142	85,398	5,971	385,477	25,304	424,162	55.70	337,449	313,985	147,940	—331,240
	12 mos.	454	8,721,090	127,921	9,004,474	1,825,706	2,108,814	73,055	3,422,295	250,726	7,503,642	83.30	1,500,832	1,337,500	—158,984	43,322
Duluth & Iron Range	Dec.	279	95,819	26,089	146,747	32,883	129,928	1,275	139,757	23,480	327,517	223.20	—180,770	—232,176	—223,931	—235,897
	12 mos.	280	6,037,528	210,100	6,818,658	1,096,677	1,309,873	14,251	2,004,926	219,862	4,648,863	68.20	2,169,795	1,650,869	1,686,323	295,841
Duluth, Missabie & Northern	Dec.	305	101,005	28,445	163,270	117,810	197,396	3,014	195,980	26,213	542,160	332.10	—378,890	—388,988	—391,715	—425,010
	12 mos.	306	13,300,960	420,958	14,976,811	1,899,053	1,855,429	37,927	3,494,403	244,130	7,551,484	50.40	7,425,327	6,615,360	6,579,607	3,650,389
Duluth, South Shore & Atlantic	Dec.	591	255,773	107,943	405,934	37,110	69,827	8,840	214,328	12,616	348,864	85.90	57,070	24,447	17,277	—74,216
	12 mos.	591	2,953,097	1,083,922	4,492,354	732,336	688,574	80,718	2,271,839	135,078	3,972,528	88.40	519,826	135,901	86,962	—594,530
Elgin, Joliet & Eastern	Dec.	459	1,939,779	10	2,161,187	139,130	620,607	11,287	702,548	38,393	1,511,528	69.90	649,659	459,790	330,091	519,647
	12 mos.	459	19,234,898	69	21,483,415	1,778,918	4,489,479	144,781	6,867,183	421,327	13,697,891	63.80	7,785,524	6,630,827	5,152,091	3,334,951
El Paso & Southwestern	Dec.	1,139	935,638	180,399	1,170,017	110,318	192,749	36,650	298,560	52,744	699,622	59.80	470,395	447,584	426,603	144,969
	12 mos.	1,139	8,030,930	1,748,490	10,421,837	1,668,672	1,674,698	319,287	2,727,425	537,715	7,016,588	67.30	3,405,249	2,471,652	2,260,162	1,165,688
Erie	Dec.	2,039	8,133,246	1,124,100	9,989,141	1,151,988	3,102,978	113,868	4,414,883	307,327	9,131,732	91.40	857,409	748,594	780,451	—1,261,291
	12 mos.	2,039	74,451,663	13,158,896	95,292,290	11,293,736	30,704.091	1,593,610	43,597,245	3,410,462	91,067,867	95.60	4,224,423	854,847	2,146,911	5,569,108
Chicago & Erie	Dec.	269	1,007,371	65,035	1,147,171	134,938	210,915	17,151	477,725	35,692	874,962	76.30	272,209	283,636	—36,802	—713,711
	12 mos.	269	10,093,543	713,272	11,581,813	1,405,767	2,008,552	228,851	4,985,044	407,221	9,033,657	78.00	2,548,156	2,006,145	—1,502,001	—3,435,413
New Jersey & New York	Dec.	45	19,841	106 358	129,837	11,988	22,019	1,060	83,404	3,617	122,088	94.00	7,749	2,927	—25,372	—32,115
	12 mos.	45	231,588	1,210,742	1,502,772	192,509	273,798	14,772	848,241	40,849	1,370,166	91.20	132,606	95,760	—219,404	—189,472
Florida East Coast	Dec.	764	721,349	348,993	1,274,968	174,368	244,652	19,594	376,836	29,962	846,638	66.40	428,330	381,558	345,494	62,661
	12 mos.	764	7,998,757	3,771,812	13,427,625	2,163,518	2,468,414	161,659	4,200,802	337,328	9,431,825	70.20	3,995,800	3,220,341	2,699,262	981,723
Fort Smith & Western	Dec.	249	123,103	30,505	164,921	33,492	28,346	4,902	57,303	7,135	132,105	80.10	32,816	26,816	20,803	—276
	12 mos.	249	1,278,737	294,916	1,692,267	327,802	295,402	57,358	580,522	81,819	1,352,543	79.90	339,724	268,312	169,531	—74,195
Galveston Wharf	Dec.	13	.....	.....	135,117	—8,955	4,407	655	38,060	7,054	82,466	61.00	52,651	—12,570	—12,073	—251,919
	12 mos.	13	.....	.....	1,597,562	505,599	44,495	8,810	376,788	49,883	1,204,838	75.40	392,724	141,649	144,447	485,725
Georgia	Dec.	328	358,218	125,543	516,577	32,232	158,129	18,756	189,007	18,777	416,981	80.70	99,596	100,804	128,767	—16,496
	12 mos.	328	3,641,692	1,214,050	5,241,926	490.484	993,185	237,788	2,416,599	229,723	4,370,003	83.40	871,923	790,300	811,838	146,358
Georgia & Florida	Dec.	405	94,319	21,695	124,398	15,089	15,374	8,120	51,762	7,112	97,673	78.50	26,725	20,300	17,372	—25,742
	12 mos.	405	1,098,882	169,506	1,362,046	203,696	197,556	97,986	535,989	78,381	1,116,182	81.90	245,864	169,865	99,106	—237,605
Great Northern	Dec.	8,255	6,216,261	1,352,332	8,533,565	825,816	1,400,812	135,446	4,120,547	198,297	6,755,630	79.20	1,777,935	1,196,075	1,465,287	1,255,936
	12 mos.	8,260	78,065,563	15,112,453	103,452,937	13,153,322	19,585,290	1,628,315	42,179,201	2,474,455	79,636,038	77.00	23,816,899	15,703,640	17,276,598	12,866,411
Green Bay & Western	Dec.	234	82,993	13,803	106,395	12,912	27,827	2,721	47,024	5,880	96,233	90.40	10,162	2,063	8,219	58.279
	12 mos.	257	1,067,944	178,094	1,349,240	249,597	226,344	29,714	526,777	34,836	1,066,885	79.00	282,355	185,945	159,402	192,661
Gulf, Coast Lines	Dec.	....	703,826	180,692	941,855	220,344	126,166	29,998	159,416	31,783	563,139	59.80	378,716	249,835	236,308	194,662
	12 mos.	....	7,811,168	1,914,584	10,413,975	1,737,922	1,586,517	319,892	2,785,310	413,885	6,926,773	66.50	3,487,202	2,932,833	2,815,849	2,141,708
Gulf & Ship Island	Dec.	307	181,146	46,546	249,625	41,773	67,538	7,852	Cr577,281	11,079	Cr443,668	—177.70	693,293	640,141	617,015	—650,352
	12 mos.	307	2,279,448	473,358	2,947,651	536,522	466,195	91,672	261,265	138,389	1,503,173	51.00	1,444,478	1,180,081	1,125,851	—434,350
Gulf, Mobile & Northern	Dec.	436	364,167	47,480	432,956	47,216	76,276	13,264	149,714	14,948	300,505	69.40	132,451	94,223	90,055	19,526
	12 mos.	436	3,930,741	418,212	4,541,436	648,110	758,719	169,015	1,571,726	183,000	3,320,391	73.10	1,221,045	918,982	791,222	98,873

REVENUES AND EXPENSES OF RAILWAYS

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1921.
			Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Illinois Central	Dec.	4,784	$10,945,525	$2,505,322	$14,415,811	$1,839,538	$3,102,764	$227,117	$5,216,763	$288,867	$10,697,600	74.20	$3,718,211	$2,746,683	$2,918,348	$7,941,191
	12 mos.	4,784	119,849,020	24,264,251	154,860,387	20,538,117	36,236,119	2,314,555	55,934,969	3,606,447	119,129,269	76.90	35,731,118	24,506,738	25,121,128	24,396,770
Yazoo & Mississippi Valley	Dec.	1,380	1,444,428	521,016	2,072,391	347,923	343,344	22,984	705,849	46,028	1,459,826	70.40	612,565	548,486	546,011	95,056
	12 mos.	1,381	14,567,737	4,163,256	19,904,961	4,471,066	3,850,132	311,326	7,660,308	573,478	16,844,615	84.60	3,060,346	1,696,943	1,631,609	811,365
Kansas City, Mexico & Orient	Dec.	272	123,193	9,655	140,168	13,429	28,801	5,098	64,905	5,183	117,416	83.80	22,752	27,791	32,284	—41,020
	12 mos.	272	1,160,541	118,217	1,375,952	287,454	286,349	57,194	742,421	70,044	1,443,462	104.90	—67,510	—152,183	—151,222	—257,679
Kans. City, Mex. & Orient of Tex.	Dec.	465	176,257	13,645	195,968	36,049	34,314	5,152	79,189	5,882	160,586	81.90	35,382	29,363	11,745	—24,461
	12 mos.	465	1,374,189	138,040	1,600,627	293,680	355,798	57,169	887,286	76,131	167,064	104.30	—69,437	—143,034	—323,671	—549,061
Kansas City Southern	Dec.	767	1,394,397	200,142	1,747,621	185,077	365,734	38,834	533,052	64,875	1,187,792	68.00	559,829	481,415	429,409	62,719
	12 mos.	767	14,551,142	2,027,952	18,221,027	2,333,293	3,822,501	48,799	6,399,281	798,790	13,786,591	75.70	4,434,436	3,270,367	2,928,772	3,814,194
Texarkanna & Ft. Smith	Dec.	81	173,042	16,517	205,994	35,066	54,910	5,684	66,031	8,880	170,566	82.80	35,428	—3,868	—7,527	23,921
	12 mos.	81	1,784,983	173,672	2,140,153	229,053	278,371	63,552	623,818	103,430	1,296,869	60.60	843,284	686,153	470,083	436,351
Kansas, Oklahoma & Gulf	Dec.	314	264,195	14,789	287,555	49,541	45,465	7,686	103,744	10,918	217,510	75.60	70,045	60,466	43,362	34,724
	12 mos.	314	2,670,582	153,566	2,933,928	532,581	330,415	71,090	1,039,454	123,182	2,098,768	71.50	835,160	717,677	555,993	—7,449
Lake Terminal	Dec.	13	.....	.....	50,373	12,774	19,388	.....	61,241	1,662	95,065	188.70	—44,692	—51,746	—51,524	21,567
	12 mos.	13	.....	.....	1,012,304	120,571	129,740	.....	558,827	19,827	828,965	81.90	183,339	117,440	190,135	173,929
Lehigh & Hudson River	Dec.	96	197,028	3,413	211,189	19,300	36,679	1,390	93,047	9,319	159,735	75.60	51,454	33,523	21,810	—31,219
	12 mos.	96	2,240,094	45,773	2,412,760	314,957	438,251	17,345	1,082,166	95,054	1,947,728	80.70	465,032	301,700	118,015	394,962
Lehigh & New England	Dec.	235	536,188	2,024	547,469	28,158	103,976	6,909	190,880	15,202	345,087	63.00	202,382	163,215	143,841	—53,467
	12 mos.	236	4,485,530	22,951	4,597,073	620,636	1,101,779	106,164	1,647,730	189,819	3,664,039	79.70	933,034	713,584	721,887	876,759
Lehigh Valley	Dec.	1,335	4,434,831	602,039	5,494,769	418,742	1,863,489	96,889	2,453,980	137,699	4,992,914	90.90	501,851	453,071	384,304	812,404
	12 mos.	1,334	50,612,722	7,022,954	62,418,889	7,070,757	19,759,604	1,241,057	29,152,786	1,514,445	59,023,940	94.60	3,394,949	1,408,999	590,084	5,842,520
Los Angeles & Salt Lake	Dec.	1,137	1,318,755	493,452	2,013,065	399,219	569,414	56,709	751,584	52,641	1,876,586	93.20	136,479	16,762	—20,129	39,130
	12 mos.	1,139	13,011,160	5,334,668	20,115,000	3,949,699	4,616,176	566,995	6,670,318	518,193	16,882,353	83.90	3,232,647	1,895,850	1,425,390	1,459,961
Louisiana & Arkansas	Dec.	302	252,086	42,758	304,352	49,520	49,468	8,241	87,304	9,494	203,780	67.00	100,572	55,969	53,809	4,459
	12 mos.	302	2,799,534	400,080	3,294,233	629,480	481,489	92,099	1,004,153	102,319	2,304,073	69.96	990,160	704,255	695,547	349,143
Louisiana Ry. & Nav. Co.	Dec.	343	268,374	41,589	334,277	57,608	54,152	10,809	136,537	11,173	270,232	80.80	64,045	43,850	10,965	—179,436
	12 mos.	343	3,018,861	389,889	3,604,117	747,127	577,623	123,771	1,392,702	135,467	2,975,047	82.50	629,070	419,975	88,642	128,025
Louisville & Nashville	Dec.	5,038	7,539,863	2,233,214	10,370,586	1,291,439	2,474,744	221,258	4,380,416	239,672	8,656,556	83.50	1,714,030	1,318,110	1,370,119	—326,388
	12 mos.	5,038	90,649,901	22,794,889	121,140,207	16,873,493	30,018,531	2,539,232	46,926,652	2,711,769	99,600,025	82.20	21,540,182	16,840,333	17,637,714	3,874,426
Maine Central	Dec.	1,194	1,074,463	389,543	1,636,965	228,256	Cr172,425	12,972	860,627	42,615	972,574	89.10	664,391	576,626	589,569	—154,212
	12 mos.	1,194	14,183,105	4,601,186	20,387,172	3,197,115	3,302,012	163,596	9,181,872	565,881	16,443,383	83.00	3,943,789	2,761,245	2,842,643	—466,962
Midland Valley	Dec.	365	294,854	77,446	388,935	106,367	159,358	7,106	144,168	18,358	434,646	111.80	—45,711	—69,672	—86,715	152,456
	12 mos.	365	3,597,683	858,388	4,661,004	918,500	652,229	62,032	1,441,308	181,224	3,246,381	69.60	1,414,623	1,224,971	1,100,049	929,723
Minneapolis & St. Louis	Dec.	1,649	1,029,448	171,437	1,274,170	300,684	360,902	29,492	658,716	42,745	1,392,711	109.30	—118,541	—191,618	—185,861	172,053
	12 mos.	1,649	12,865,023	1,835,373	15,558,248	2,245,452	2,921,073	291,703	7,398,718	482,280	13,337,709	85.70	2,220,539	1,389,754	883,800	273,291
Minn., St. Paul & S. S. Marie	Dec.	4,380	3,221,514	646,051	4,204,891	625,613	473,501	73,736	1,845,046	109,973	3,145,747	74.80	1,059,144	814,160	817,671	—518,719
	12 mos.	4,383	35,529,522	7,378,176	47,107,105	6,885,060	7,310,920	741,565	20,091,208	1,253,749	36,442,851	77.40	10,664,254	7,595,372	7,178,971	—696,584
Mississippi Central	Dec.	258	105,751	21,796	132,987	21,670	11,656	6,685	52,248	6,339	98,598	74.10	34,389	30,405	35,775	—7,733
	12 mos.	259	1,235,227	203,844	1,502,610	247,897	347,485	69,896	528,049	82,615	1,275,942	84.90	226,668	154,946	193,303	—125,708
Missouri, Kans. & Texas	Dec.	1,670	2,221,927	541,202	3,056,252	258,716	642,065	51,771	969,187	87,892	2,018,102	66.00	1,038,150	873,876	953,045	399,859
	12 mos.	1,670	23,395,948	5,686,304	31,991,331	3,434,246	6,581,068	551,444	9,696,671	1,049,404	21,399,657	66.90	10,591,674	8,467,537	9,204,091	6,256,808
Mo., Kans. & Tex. of Tex.	Dec.	1,738	1,338,018	457,808	1,946,705	316,005	414,214	41,769	831,323	72,950	1,668,649	85.70	278,056	200,105	—98,188	—524,112
	12 mos.	1,737	14,602,696	5,010,095	21,469,110	3,444,051	3,759,149	479,676	8,463,703	878,396	16,995,801	79.20	4,473,309	3,779,522	1,280,467	2,041,953
Wichita Falls & Northwestern	Dec.	329	112,785	20,931	140,485	35,131	18,271	820	48,773	6,118	108,579	77.30	31,906	19,657	—1,492	80
	12 mos.	329	1,199,757	262,013	1,575,260	358,980	207,877	10,316	619,633	95,909	1,288,243	81.80	287,017	147,210	—89,538	482,167
Missouri Pacific	Dec.	7,148	6,270,061	1,656,899	8,726,795	1,429,483	1,980,743	163,348	3,798,428	255,030	7,671,389	87.90	1,055,406	997,106	1,523,314	—88,194
	12 mos.	7,261	73,918,551	16,898,650	99,921,331	17,282,957	20,996,699	1,841,420	41,152,481	3,085,979	84,658,915	84.70	15,262,416	11,206,433	8,247,035	9,884,376
Mobile & Ohio	Dec.	1,165	1,282,857	198,487	1,585,542	216,784	388,468	45,084	518,205	48,507	1,217,998	76.80	367,544	291,517	266,910	178,530
	12 mos.	1,165	15,101,088	1,813,031	17,878,005	2,139,157	3,908,679	315,336	6,695,226	565,267	13,834,221	77.40	4,043,784	3,280,909	2,713,282	1,174,974
Monongahela	Dec.	106	356,020	43,938	407,991	Cr46,608	97,000	1,393	165,787	6,257	223,829	82.07	184,162	171,662	102,068	66,384
	12 mos.	106	3,253,938	403,240	3,723,939	409,471	686,515	17,217	1,146,166	108,730	2,368,099	66.57	1,355,840	1,250,676	717,193	676,342
Monongahela Connecting	Dec.	7	.....	.....	202,473	29,844	35,363	607	122,665	4,287	192,766	95.20	9,707	1,096	—17,073	—2,151
	12 mos.	7	.....	.....	1,715,071	241,116	307,760	6,416	864,386	87,815	1,507,493	87.90	207,578	174,995	103,334	—77,844
Montour	Dec.	56	137,311	546	141,415	Cr8,840	150,210	1,014	Cr9,342	6,448	139,490	98.60	1,925	10,622	36,341	19,089
	12 mos.	56	1,115,082	7,950	1,138,757	213,732	443,822	12,156	225,929	75,401	971,040	85.20	167,717	132,382	277,022	205,445
Nash., Chatt. & St. Louis	Dec.	1,258	1,378,799	459,445	2,000,862	200,708	399,581	65,258	787,184	62,597	1,522,366	76.10	478,496	443,390	482,853	—276,856
	12 mos.	1,258	16,055,719	4,678,038	22,353,763	3,339,580	5,464,098	818,197	8,820,897	708,899	19,207,688	85.90	3,146,075	2,709,084	3,094,209	1,071,618
Nevada Northern	Dec.	165	33,729	6,509	44,272	11,509	3,778	592	11,915	2,983	30,777	69.50	13,495	5,990	6,305	—4,870
	12 mos.	165	472,072	55,931	575,771	120,356	52,041	5,360	111,405	35,184	324,346	56.30	251,425	172,240	187,175	—96,440
Newburg & South Shore	Dec.	7	.....	.....	183,359	16,181	53,958	.....	85,093	4,402	159,634	87.10	23,725	—7,815	—16,872	32,060
	12 mos.	7	.....	.....	1,950,343	176,349	471,778	.....	794,346	45,211	1,487,684	76.30	462,659	292,925	252,858	200,152
New Orleans Great Northern	Dec.	274	181,688	36,052	224,021	29,370	15,125	8,527	62,977	7,017	123,306	55.00	100,715	85,881	86,457	—5,075
	12 mos.	274	2,013,312	424,408	2,547,752	375,085	334,346	65,145	798,767	113,771	1,689,409	66.30	858,343	676,670	643,378	—20,291
New York Central	Dec.	6,893	22,287,110	8,508,778	34,979,130	3,482,120	7,669,869	400,489	14,518,117	882,346	27,352,568	78.20	7,626,562	7,573,619	6,782,171	11,898,659
	12 mos.	6,893	227,751,833	91,961,017	363,122,527	41,488,965	93,651,539	4,164,365	137,417,239	9,535,306	290,477,034	80.00	72,645,493	52,901,929	53,716,459	59,031,276
Cincinnati Northern	Dec.	244	320,975	16,629	345,621	53,927	62,585	5,194	134,087	8,014	263,298	76.20	82,323	67,397	21,155	30,637
	12 mos.	244	3,233,130	178,132	3,505,287	667,046	666,944	60,165	1,212,372	97,472	2,697,736	77.00	807,551	623,084	348,557	702,255

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of—Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1921.
Indiana Harbor Belt	Dec.	120	.....	.....	$921,592	$134,652	$98,307	$2,226	$486,389	$19,720	$741,294	80.40	$180,298	$162,358	$12,047	$1,125,775
	12 mos.	119	.....	.....	10,299,400	1,237,170	1,145,032	48,254	4,284,667	230,347	6,945,470	67.40	3,353,930	2,913,982	1,718,992	1,578,852
Michigan Central	Dec.	1,862	$5,144,155	$1,818,023	7,817,075	951,289	1,593,090	81,024	2,929,117	140,594	5,765,875	73.80	2,051,200	1,999,208	1,856,207	2,535,798
	12 mos.	1,862	55,721,158	19,247,622	83,426,407	9,007,594	18,043,228	1,098,623	28,909,507	1,679,988	59,576,357	71.40	23,850,050	19,264,850	18,066,109	15,403,271
Pittsburgh & Lake Erie	Dec.	231	3,194,576	275,330	3,735,190	350,782	1,276,651	26,990	1,179,977	63,902	2,899,012	77.60	836,178	844,066	1,054,937	2,319,404
	12 mos.	228	25,618,907	2,815,647	29,570,983	3,341,517	10,933,564	256,909	9,781,745	742,227	25,080,013	84.80	4,490,970	3,392,865	5,279,742	4,066,871
New York, Chicago & St. Louis	Dec.	1,242	3,372,955	158,779	3,682,446	305,716	923,052	79,796	1,514,401	121,454	2,948,303	80.10	734,143	761,974	*692,098	538,067
	12 mos.	1,242	36,282,384	1,773,126	39,406,081	4,677,551	8,204,529	938,118	15,157,724	1,365,428	30,415,059	77.20	8,991,022	6,986,721	*6,601,148	4,625,349
New York, New Haven & Hartford	Dec.	2,000	5,099,765	4,402,939	10,817,569	1,169,725	2,562,734	46,881	4,868,890	295,574	9,128,600	84.40	1,688,969	1,363,803	659,748	748,532
	12 mos.	2,002	59,931,676	49,217,795	123,246,641	16,488,932	26,404,332	657,359	51,082,709	3,405,297	99,988,856	81.10	23,257,785	18,640,902	12,074,160	740,034
Central New England	Dec.	295	531,978	18,744	585,247	91,003	124,543	4,197	275,273	11,678	506,829	86.60	78,418	36,896	—12,581	78,447
	12 mos.	295	6,226,291	225,665	6,790,751	1,404,670	1,091,545	51,759	2,535,633	133,769	5,217,236	76.80	1,573,515	1,285,071	751,880	1,297,332
New York, Ontario & Western	Dec.	569	705,134	142,005	1,005,440	140,689	263,016	17,576	574,090	30,333	1,025,446	102.00	—20,006	—77,989	—163,023	21,021
	12 mos.	569	7,275,680	3,046,842	12,341,912	1,757,661	2,493,152	193,934	6,161,731	360,915	10,985,547	89.00	1,356,365	901,080	334,216	1,297,074
Norfolk & Western	Dec.	2,237	5,684,548	911,660	6,960,753	907,159	2,230,819	72,678	2,725,808	155,097	6,110,846	87.80	849,907	399,362	642,677	2,138,886
	12 mos.	2,237	77,637,431	9,192,599	90,314,743	12,446,292	23,524,842	933,096	29,139,207	1,773,708	67,977,202	75.30	22,337,541	16,328,683	18,624,468	14,870,021
Norfolk Southern	Dec.	930	541,170	151,069	734,487	79,166	75,504	21,038	315,358	29,287	520,968	70.90	213,519	152,151	122,077	147,499
	12 mos.	930	6,469,657	1,476,853	8,412,957	1,182,652	1,296,602	262,023	3,506,959	349,349	6,595,435	78.40	1,817,522	1,413,673	1,108,375	772,275
Northern Pacific	Dec.	6,631	6,183,116	1,357,765	8,342,182	945,498	987,915	144,947	3,429,566	239,071	5,823,009	69.80	2,519,173	2,071,033	2,868,886	2,005,527
	12 mos.	6,640	71,725,004	15,551,897	96,076,067	12,826,643	18,064,616	1,670,066	36,801,627	2,565,955	72,654,710	75.60	23,421,357	14,965,791	19,450,513	10,843,826
Northwestern Pacific	Dec.	496	316,835	198,173	587,302	108,302	114,356	5,950	241,276	15,695	487,388	83.00	99,914	49,031	45,483	—28,785
	12 mos.	500	4,429,383	2,641,860	8,008,843	1,226,527	1,144,959	82,325	3,055,964	177,069	5,705,934	71.20	2,302,909	1,727,218	1,563,167	1,608,331
Pennsylvania	Dec.	10,537	37,839,277	13,432,008	57,444,562	5,910,812	15,498,576	617,104	24,347,640	1,405,262	48,606,050	84.60	8,838,512	6,980,207	6,028,306	457,074
	12 mos.	10,537	439,528,929	147,424,247	646,352,108	78,536,995	167,127,562	6,953,139	255,732,666	16,128,117	534,118,684	82.60	112,233,424	83,302,998	73,555,149	37,157,334
Balti., Chesa. & Atlantic	Dec.	87	59,867	35,614	100,471	9,373	Cr12,960	1,390	77,998	4,212	80,013	79.60	20,458	20,405	18,340	—20,347
	12 mos.	87	1,029,915	468,856	1,564,866	162,359	341,760	21,733	960,374	44,894	1,531,125	97.80	33,741	—14,074	—19,133	69,344
Long Island	Dec.	397	799,658	1,360,644	2,378,441	297,865	455,027	16,164	1,181,495	61,725	2,029,748	85.30	348,693	149,256	1,562	—67,761
	12 mos.	397	8,937,569	19,250,024	30,951,540	3,317,775	5,118,249	214,778	13,591,051	690,298	23,173,819	74.90	7,777,721	5,951,290	4,967,454	3,311,214
Maryland, Delaware & Virginia	Dec.	82	58,698	26,151	89,453	6,611	Cr3,364	522	74,322	2,570	80,661	90.20	8,792	8,825	9,006	—25,469
	12 mos.	82	764,878	366,891	1,173,967	113,255	262,078	20,438	820,244	29,584	1,245,599	106.10	—71,632	—92,008	—105,235	—102,437
West Jersey & Seashore	Dec.	359	448,400	441,850	970,794	169,603	185,219	11,434	500,641	24,828	903,796	93.10	66,998	66,998	49,715	—221,485
	12 mos.	359	5,125,703	7,798,919	14,018,091	2,039,717	2,487,917	195,339	6,367,693	335,384	11,576,412	82.60	2,441,579	1,540,574	1,279,702	286,636
Peoria & Pekin Union	Dec.	19	23,673	2,796	124,395	21,738	36,041	484	94,845	11,196	164,304	132.10	—39,909	—60,313	—50,965	81,039
	12 mos.	19	206,762	42,365	1,803,775	311,293	192,404	3,554	799,971	109,956	1,417,178	78.60	386,597	194,693	482,967	253,399
Pere Marquette	Dec.	2,212	2,601,951	451,587	3,390,331	367,671	898,316	51,007	1,370,713	101,103	2,797,676	82.50	592,655	421,134	293,817	107,377
	12 mos.	2,216	29,853,252	4,946,793	38,397,934	4,505,904	7,750,757	614,328	14,716,442	1,249,076	28,911,264	75.30	9,486,670	7,684,739	6,080,575	5,674,557
Philadelphia & Reading	Dec.	1,124	7,517,385	912,597	8,858,626	630,719	1,538,393	58,761	3,403,980	147,028	5,802,890	65.50	3,055,736	1,901,158	1,728,677	2,395,129
	12 mos.	1,126	67,463,011	9,950,155	81,934,751	8,679,417	19,591,117	743,530	31,113,637	1,743,021	62,055,322	75.70	19,879,429	16,622,251	14,328,714	12,805,667
Atlantic City	Dec.	176	103,236	132,013	259,025	93,314	36,529	6,334	175,768	8,129	319,746	123.40	—60,721	—80,858	—117,239	—67,575
	12 mos.	176	1,460,508	3,007,223	4,626,752	802,526	450,173	77,585	2,705,534	59,653	4,093,353	88.50	533,399	292,287	—182,676	64,397
Perkiomen	Dec.	41	102,639	7,123	113,710	5,965	5,179	112	41,606	912	53,799	47.30	59,911	38,285	33,397	63,754
	12 mos.	41	1,151,575	96,801	1,293,261	85,805	50,461	1,298	515,175	10,892	664,043	51.30	629,218	551,822	482,939	483,795
Port Reading	Dec.	21	188,542	.....	246,627	13,289	4,695	229	87,272	1,291	106,776	43.30	139,851	129,968	72,245	23,310
	12 mos.	21	1,383,775	.....	1,898,438	222,826	122,215	2,748	689,038	20,527	1,057,352	55.70	841,086	677,841	113,891	146,391
Pittsburgh & West Virginia	Dec.	85	243,252	9,990	282,465	28,493	85,111	3,034	78,173	28,352	233,213	82.56	49,252	4,924	79,872	—110,760
	12 mos.	85	2,375,412	106,240	2,835,601	396,899	728,555	42,206	760,645	193,773	2,236,825	78.88	598,776	233,475	797,705	—827,198
Pittsburgh, Shawmut & Northern	Dec.	210	137,451	8,436	149,191	18,384	51,357	1,496	63,579	16,479	151,298	101.40	—2,107	—6,688	15,356	—210,214
	12 mos.	210	1,151,463	76,943	1,271,751	253,118	527,197	19,739	551,445	88,917	1,440,471	113.20	—168,720	—199,376	—133,463	—379,465
Quincy, Omaha & Kansas City	Dec.	252	86,126	25,609	114,956	41,275	26,034	970	112,776	2,533	183,187	159.40	—68,231	—68,632	—74,521	—40,954
	12 mos.	252	849,588	287,339	1,242,291	372,713	214,713	10,007	673,560	26,935	1,295,118	104.30	—52,827	—96,457	—168,318	—195,672
Richmond, Fred. & Potomac	Dec.	117	461,385	371,846	1,067,430	84,506	102,842	7,563	387,318	30,554	628,967	58.90	438,463	350,019	269,990	131,460
	12 mos.	117	5,519,673	3,572,573	10,975,812	1,252,449	1,458,207	94,787	3,882,449	333,920	7,234,904	65.90	3,740,908	3,107,632	2,543,648	1,275,457
Rutland	Dec.	415	279,276	125,544	500,265	62,916	100,011	9,521	251,380	16,310	441,702	88.30	58,563	36,188	54,424	58,070
	12 mos.	415	3,167,577	1,477,880	5,803,158	1,088,292	1,116,251	100,336	2,610,526	160,799	5,094,821	87.80	708,337	445,492	530,432	450,911
St. Louis-San Francisco	Dec.	4,760	4,638,921	1,865,668	7,001,090	924,390	1,202,850	88,528	2,965,285	184,415	5,343,457	76.30	1,657,633	1,453,058	1,511,062	1,132,050
	12 mos.	4,760	54,759,680	18,512,216	79,170,251	11,423,219	14,707,604	1,004,122	30,060,083	2,254,315	59,143,768	74.70	20,026,483	16,357,765	15,490,000	17,858,444
Ft. Worth & Rio Grande	Dec.	235	103,560	31,320	144,195	50,276	35,281	3,392	35,626	8,350	131,387	91.10	12,808	6,085	—7,179	39,577
	12 mos.	235	932,056	349,435	1,407,622	476,829	311,417	33,378	620,110	72,392	1,508,085	107.10	—100,463	—147,938	—249,977	—150,771
St. Louis, San Fran. & Tex	Dec.	134	135,243	15,037	157,499	40,810	23,430	3,611	12,297	7,223	87,371	55.50	70,078	65,911	48,616	40,681
	12 mos.	134	1,450,904	180,417	1,709,052	362,035	277,114	44,116	644,627	83,034	1,410,013	82.50	299,039	273,279	8,504	—244,221
St. Louis-Southwestern	Dec.	968	1,732,000	187,171	1,983,049	152,975	307,979	42,886	523,919	53,140	1,086,814	54.80	896,235	806,061	725,427	604,340
	12 mos.	968	16,251,232	1,598,621	18,548,233	2,318,040	2,794,051	500,913	5,081,145	634,664	11,389,141	61.40	7,159,092	6,246,748	5,666,588	5,566,684
St. Louis-Southwestern of Tex	Dec.	807	579,017	112,744	728,716	175,620	234,979	21,225	438,282	33,020	887,552	121.80	—158,836	—214,912	—215,465	—2,081
	12 mos.	807	6,045,973	1,088,172	7,611,691	1,981,096	2,037,353	240,056	4,010,514	375,072	8,615,435	113.20	—1,003,744	—1,324,865	—1,279,763	—807,925
San Antonio, Uvalde & Gulf	Dec.	317	46,689	18,478	70,639	17,582	13,647	3,309	36,947	5,755	77,240	109.30	—6,601	—9,861	—19,257	—14,675
	12 mos.	317	720,732	211,438	1,033,309	185,996	142,934	34,562	410,440	82,776	855,369	82.80	177,940	139,682	7,269	47,970
Southern	Dec.	6,971	8,099,814	3,120,253	12,224,292	1,195,172	2,193,339	213,450	4,754,391	312,752	8,751,683	71.60	3,472,609	2,957,090	2,492,223	1,805,948
	12 mos.	6,971	88,091,272	30,264,514	128,489,847	17,295,517	21,927,548	2,479,929	50,754,013	3,760,407	97,170,133	75.60	31,319,714	25,466,204	20,472,778	13,971,783

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1922—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Net after rentals 1921.
Alabama Grt. Southern	Dec.	318	$622,197	$190,089	$867,211	$34,027	$184,876	$20,748	$295,087	$20,777	$558,754	64.40	$308,457	$259,926	$295,312	$303,292
	12 mos.	318	6,171,637	1,845,890	8,524,804	994,417	1,737,193	217,624	3,266,258	285,239	6,565,760	77.00	1,959,044	1,464,596	1,483,909	1,020,786
Cin., N. O. & Tex. Pac.	Dec.	338	1,252,072	375,321	1,733,743	102,924	390,105	39,946	569,589	42,575	1,152,926	66.50	580,817	534,169	440,408	232,491
	12 mos.	338	12,599,962	3,330,278	16,801,374	1,938,245	4,308,898	351,867	6,125,702	498,457	13,331,264	79.40	3,479,110	2,681,154	1,910,018	1,942,444
Georgia Southern & Fla.	Dec.	402	220,870	139,426	403,060	51,526	67,017	8,288	138,796	12,036	280,859	69.70	122,201	120,629	96,977	67,157
	12 mos.	402	2,912,376	1,236,824	4,518,016	741,174	791,276	103,838	1,928,031	146,408	3,744,211	82.90	773,805	568,279	394,539	—552,560
New Orleans & Northeastern	Dec.	207	409,509	93,639	583,296	82,763	95,511	12,374	220,807	15,884	429,968	73.70	153,328	123,665	124,176	40,989
	12 mos.	207	3,914,218	943,358	5,506,622	849,091	1,242,809	130,101	2,533,385	199,105	4,996,606	90.70	510,016	74,577	32,260	—259,590
Northern Alabama	Dec.	110	138,625	14,780	157,105	13,108	7,018	1,210	54,176	3,135	78,647	50.10	78,458	78,792	51,982	44,564
	12 mos.	110	1,266,499	143,366	1,443,503	209,741	75,076	15,093	556,760	35,424	892,092	61.80	551,411	507,464	203,415	1,262
Southern Pacific	Dec.	7,116	10,161,489	3,996,498	15,780,061	2,033,283	2,922,140	269,129	5,101,773	523,426	11,070,279	70.20	4,709,782	3,018,263	2,830,317	255,177
	12 mos.	7,118	121,080,556	44,565,893	183,675,381	23,854,200	31,807,716	2,909,311	60,628,498	5,341,067	127,774,264	69.60	55,901,117	40,238,362	39,069,196	33,726,377
Arizona Eastern	Dec.	382	255,879	31,678	297,311	29,378	44,386	2,875	121,895	18,392	217,955	73.30	79,356	54,305	40,186	—6,532
	12 mos.	382	2,700,641	341,782	3,175,311	398,237	380,653	37,614	937,108	219,331	1,983,946	62.50	1,191,365	899,021	725,989	—11,785
Atlantic S. S. Lines	Dec.	....	1,021,861	48,905	1,121,883	26,175	452,056	23,470	739,725	34,672	1,276,098	113.70	—154,215	—167,913	—167,643	—387,426
	12 mos.	....	10,791,546	627,632	12,030,072	172,726	2,730,533	238,883	7,017,242	334,779	10,494,163	87.20	1,535,909	1,387,706	1,390,336	—40,315
Galv., Harris. & S. Antonio	Dec.	1,379	1,552,774	431,122	2,136,908	454,189	469,479	49,108	750,396	73,481	1,763,088	82.50	373,820	251,898	191,997	—548,089
	12 mos.	1,379	16,422,195	4,542,546	22,254,213	4,098,173	4,528,750	459,587	8,769,084	870,816	18,739,149	84.20	3,515,064	2,753,534	1,994,775	1,484,344
Houston & Texas Central	Dec.	932	979,869	314,609	1,399,984	346,954	294,380	25,706	635,833	43,645	1,345,835	96.10	54,149	—130,687	—156,953	—19,945
	12 mos.	932	10,597,691	3,520,691	15,087,424	2,897,002	2,899,592	287,245	5,326,137	512,534	11,902,060	78.90	3,185,364	2,482,160	2,022,081	1,432,705
Houston, East & West Texas	Dec.	191	217,219	56,180	291,465	77,734	76,018	3,741	203,920	8,294	368,833	126.50	—77,368	—92,075	—110,842	—81,941
	12 mos.	191	2,501,949	516,475	3,173,666	621,033	672,643	41,990	1,326,018	97,463	2,735,084	86.20	438,582	344,505	141,949	148,707
Louisiana Western	Dec.	207	307,191	102,642	441,686	22,783	108,703	9,737	108,230	16,648	269,938	61.10	171,748	144,739	136,898	—114,015
	12 mos.	207	2,956,369	1,046,311	4,303,197	637,977	912,440	103,966	1,224,767	208,325	3,135,158	72.90	1,168,039	863,339	854,743	525,563
Morgan's La. & Tex. R. R. & SS.	Dec.	400	778,719	176,228	1,022,143	131,553	236,932	16,862	352,258	32,241	774,537	75.80	247,606	196,664	133,106	—289,625
	12 mos.	400	6,066,293	1,822,381	8,533,387	1,682,495	2,066,062	186,077	3,307,421	393,009	7,691,891	90.10	841,496	269,229	13,023	—653,056
Texas & New Orleans	Dec.	507	548,372	174,435	785,469	268,305	174,665	14,151	378,085	24,574	864,530	110.10	—79,061	—162,181	—207,775	—332,766
	12 mos.	507	6,341,935	1,842,407	8,747,306	2,012,401	2,070,365	139,558	3,457,250	305,523	8,047,285	92.00	700,021	321,554	—91,054	—630,626
Spokane International	Dec.	165	83,672	21,646	110,769	14,777	9,019	3,084	43,550	6,061	75,748	68.40	35,021	27,970	21,265	—7,164
	12 mos.	165	987,381	180,608	1,229,532	178,438	105,605	37,328	424,840	72,018	825,082	67.10	404,450	335,424	254,453	165,768
Spokane, Portland & Seattle	Dec.	551	460,884	160,589	697,894	73,942	113,919	10,269	210,530	23,162	440,709	63.10	257,185	195,420	183,968	235,273
	12 mos.	551	4,927,827	1,723,494	7,364,072	720,135	1,110,847	121,328	2,413,937	245,263	4,715,456	64.30	2,648,616	1,752,965	1,624,198	1,681,056
Tenessee Central	Dec.	292	168,142	46,572	227,252	22,660	22,128	5,920	99,375	9,264	159,196	70.10	68,056	62,083	40,034	.....
	12 mos.	292	1,743,060	448,627	2,333,534	361,275	338,060	63,481	1,011,682	94,360	1,868,186	80.10	465,346	414,789	135,512	.....
Term. R. R. Assn. of St. Louis	Dec.	37	.....	.....	386,373	62,948	28,989	1,038	109,079	5,665	211,011	54.60	175,362	73,687	209,250	189,685
	12 mos.	37	.....	.....	4,498,456	863,322	495,594	12,622	1,560,649	62,690	3,037,692	67.50	1,460,764	728,907	2,146,790	1,992,743
East St. Louis Connecting	Dec.	1	.....	.....	205,700	13,513	Cr. 6,828	294	78,342	3,201	88,522	43.00	117,178	78,209	63,408	—5,304
	12 mos.	1	.....	.....	2,099,554	151,637	93,225	3,636	706,701	32,232	987,431	47.00	1,112,123	960,221	848,801	317,755
St. L. Merchants' Bridge Term.	Dec.	9	.....	.....	430,586	41,883	Cr. 4,996	915	228,104	6,024	271,930	63.20	158,656	79,580	36,751	44,873
	12 mos.	9	.....	.....	4,118,952	539,084	303,396	11,191	1,915,993	59,325	2,828,989	68.70	1,289,963	961,826	1,044,759	729,336
St. Louis Transfer	Dec.	6	.....	.....	76,540	5,530	425	170	45,535	1,474	53,134	69.40	23,406	29,815	23,676	17,189
	12 mos.	6	.....	.....	759,648	104,380	56,500	2,100	410,300	19,369	592,649	78.00	166,999	166,388	74,909	425,939
Texas & Pacific	Dec.	1,952	2,324,591	721,655	3,268 051	372,128	671,274	48,227	1,169,246	95,887	2,382,167	72.90	885,884	805,828	649,880	—1,973,579
	12 mos.	1,952	21,738,482	7,279,004	31,381,795	5,051,050	6,544,264	586,305	11,843,491	1,225,780	25,494,086	81.20	5,887,709	4,648,370	3,629,472	2,832,148
Toledo, Peoria & Western	Dec.	247	80,250	48,007	143,374	39,362	43,960	2,579	87,078	7,686	180,665	126.00	—37,291	—52,626	—58,591	47,392
	12 mos.	247	1,043,520	509,672	1,705,418	350,711	405,618	32,537	879,144	92,531	1,760,453	103.20	—55,035	—191,877	—212,424	—308,649
Trinity & Brazos Valley	Dec.	368	178,899	22,601	209,371	45,438	32,692	2,845	56,547	13,833	150,995	72.10	58,376	46,500	18,084	3,726
	12 mos.	368	2,418,884	255,196	2,777,179	613,363	506,475	38,556	980,060	139,778	2,272,449	81.80	504,730	415,183	—13,858	288,066
Ulster & Delaware	Dec.	128	69,445	17,132	116,651	23,502	31,440	1,839	75,094	8,420	140,795	120.60	—24,144	—30,147	—34,365	166,426
	12 mos.	128	766,873	482,066	1,652,803	280,897	283,835	35,332	874,964	100,213	1,580,579	95.60	72,224	120	—47,551	217,604
Union	Dec.	45	.....	.....	844,912	44,620	168,635	266	492,814	8,643	714,978	84.60	129,934	—43,689	30,896	—70,407
	12 mos.	45	.....	.....	11,184,564	841,664	2,096,304	2,798	4,886,396	85,643	7,912,805	70.70	3,271,759	3,003,391	3,899,383	2,139,492
Union Pacific	Dec.	3,708	6,974,929	1,458,754	9,507,117	502,844	2,009,277	149,315	3,458,252	291,893	6,574,041	69.20	2,933,076	2,573,847	2,583,614	1,923,115
	12 mos.	3,693	80,686,246	17,369,420	107,842,566	11,977,805	22,373,737	1,634,433	32,248,330	3,592,729	73,921,927	68.60	33,920,639	27,164,947	26,621,319	28,351,910
Oregon Short Line	Dec.	2,366	2,580,842	455,964	3,323,022	323,407	585,197	48,877	956,962	116,660	2,092,874	63.00	1,230,148	1,175,675	1,164,000	637,662
	12 mos.	2,361	28,538,554	5,517,058	36,779,501	5,243,081	6,688,993	530,016	12,074,716	1,382,129	26,640,759	72.40	10,138,742	7,104,547	6,825,884	5,630,965
St. Joseph & Gr. Isl	Dec.	258	224,269	27,769	271,136	55,720	78,943	2,979	126,410	12,905	278,214	102.60	—7,078	7,212	1,004	9,052
	12 mos.	258	2,653,318	309,094	3,171,594	605,602	643,735	31,305	1,397,605	143.761	2,827,098	89.10	344,496	173,670	70,029	141,070
Utah	Dec.	102	180,434	834	182,529	25,737	55,493	566	51,715	7,007	140,518	77.00	42,011	36,649	31,281	—11,351
	12 mos.	102	1,744,884	9,023	1,769,642	301,459	464,433	4,607	466,419	60,997	1,297.363	73.30	472,259	397,965	266,296	—9,423
Virginian	Dec.	540	1,305,283	82,327	1,489,473	192,620	464,909	11,905	465,566	37,069	1,174,351	78.80	315,122	170,600	247,189	66,050
	12 mos.	530	16,956,023	827,568	19,009,444	2,193,206	4,838,605	140,566	4,902,970	386,006	12,439,391	65.40	6,570,053	5,040,846	5,373,544	4,726,940
Wabash	Dec.	2,472	3,541,595	814,125	4,835,046	541,877	1,111,712	111,698	1,977,689	149,086	3,913,996	81 00	921,050	731,914	456,239	—132,488
	12 mos.	2,472	43,911,074	9,087,894	57,662,496	8,270,927	12,282,949	1,378,262	24,086,905	1,775,867	48,041,297	83.30	9,621,199	7,334,653	4,107,421	3,863,340
Western Maryland	Dec.	804	1,629,531	82,084	1,805,477	386,719	376,232	39,244	645,093	47,510	1,514,008	83.90	291,469	235,941	269,482	249,730
	12 mos.	804	16,406,378	973,055	18,575,350	2,787,715	4,052,903	425,052	8,656,125	549,034	14,730,157	79 30	3,845,193	3,239,665	3,074,576	3,027,627
Western Pacific	Dec.	1,043	836,483	113,734	1,021,503	107,392	190,350	35,076	397,118	49,559	789,341	77.30	232,162	162,743	227,461	—464,903
	12 mos.	1,042	9,466,534	2,150,151	12,494,040	1,970,514	2,201,839	398,037	4,566,409	453.271	9,826,714	78.70	2,667,326	1,704,319	1,966,442	851,995
Wheeling & Lake Erie	Dec.	511	890,401	65,933	1,040,812	58,131	254,283	16,276	452,416	35,457	817,124	78.50	223,688	140,620	62,121	—50,899
	12 mos.	511	11,249,810	777,463	13,153,888	2,053,828	3,389,877	209,679	5,049,063	411,138	11,146,707	84.70	2,007,181	776,591	393,880	1,755,356

Traffic News

The Consolidated Ticket Office at Seattle, Wash., has been discontinued, the Great Northern, Northern Pacific and Union Pacific having opened separate city ticket offices. The Chicago, Milwaukee & St. Paul withdrew from the consolidation some time ago.

F. A Leland, tariff publication agent of the Southwestern lines, and the traffic officers of the Kansas City, Mexico & Orient are now revising the existing tariffs on the Orient road to make effective the differential rates authorized recently by the Interstate Commerce Commission.

The Traffic Club of Houston, Tex., has elected the following officers for the year 1923: president, S. G. Reed, Southern Pacific; vice-president, L. M. Hogsett, Houston Chamber of Commerce; secretary, A. R. Canfield, San Antonio & Aransas Pass; and treasurer, H. J. Scott, Port Commission of the city of Houston.

The Sioux City-Omaha Navigation Company is being organized at Sioux City, Iowa, by T. P. Craig, formerly manager at St. Louis, for the federal barge service on the Mississippi river. The company proposes to operate regular freight boats on the Missouri river from Sioux City to St. Louis, Kansas City, Omaha and intermediate points.

The Farmers' and Grain Dealers' Association of Iowa, at its annual convention at Des Moines, adopted a resolution favoring giving the state railroad commission control over freight car distribution within certain specified areas. The convention also advocated the repeal of the so-called guarantee clause of the Esch-Cummins rail act.

The Traffic Bureau of the St. Louis Chamber of Commerce, foreseeing a record-breaking freight tonnage during the coming year, has sent a circular letter to its members, urging them to co-operate in the development of a more efficient transportation system by following the suggestions of the car service division of the American Railway Association, contained in its circular of December 1.

The Long Island Railroad reports that in the month of January it received at its ferry terminals in New York harbor 6,590 carloads of coal which were delivered to Brooklyn and other Long Island consignees with unusual promptness, consignees co-operating by prompt unloading of the cars. This movement was 140 per cent above the normal coal movement for January.

The granting of a single certificate permitting operation of ten bus lines by the Colorado Motor Ways Company, Inc., is being protested by the Denver & Rio Grande Western, the Colorado & Southern, the Atchison, Topeka & Santa Fe, the Chicago, Rock Island & Pacific and the Union Pacific. The railroads base their opposition on the fact that each of them has to have a separate certificate. The Colorado Motor Ways Company operates lines to Colorado Springs, Colorado, Ft. Collins, Limon and other towns and cities in the state of Colorado.

The Chamber of Commerce of the United States has announced the appointment of A. B. Barber, of Portland, Oregon, as manager of the Department of Transportation and Communication, succeeding J. R. Bibbins, resigned. For the past three years, Mr. Barber has been technical adviser to the Republic of Poland. He is a graduate of West Point and served in France with a railway commission to report on the needs of the French railways and later was assigned to General Pershing's staff. From June to November, 1918, he was at the front with the First Corps, and First and Second Armies.

SASKATCHEWAN has 9,250,000 head of poultry, and recently sent nine carloads of eggs to England.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has decided to give to the press daily a memorandum containing information of action by Division 4 in uncontested cases on its finance docket. The parties usually are promptly informed of the decisions in such cases and this has resulted in numerous instances in newspaper queries being made to the commission before the issuance of its formal orders.

S. P. Authorized to Extend Steamship Service

The Interstate Commerce Commission has issued a supplemental order granting, with an exception, the application of the Southern Pacific Company under the provisions of the Panama Canal Act for a modification of the commission's order of May 12, 1917, so as to permit the operation of its Atlantic Steamship Lines in either regular or irregular service between New York and Sabine Pass, Texas City, Freeport, Houston and Orange, Tex.; and between Portland, Me., Boston, Fall River and New Bedford, Mass.; Providence, R. I., Philadelphia, Pa., and Baltimore, Md., on the one hand and New Orleans, La., Galveston, Tex., and the other Gulf ports named on the other hand. The commission finds that the rail lines of the applicant may compete with its steamship lines, but that the operation of those lines as requested, except from Philadelphia to Houston, is in the interest of the public and of advantage to the convenience and commerce of the people and will neither exclude, prevent nor reduce competition on the routes by water. On the company's original application under the Panama canal act the commission found that the continuation of its ownership of its Atlantic Steamship Lines operating between New York and New Orleans and between New York and Galveston was in the interests of the public and no finding was made as to the additional occasional sailings between Gulf ports and North Atlantic ports. After the return of the properties to their owners after federal control, the company received requests to provide steamship service between Gulf and North Atlantic ports not authorized by the commission's order and finally responding to those requests, it filed the supplemental application.

Court News

Defect of Automatic Coupler Held Question for Jury

In an action to enforce liability for the death of an employee the only defect claimed arose from the lateral play of the drawbar of the engine. It was contended that the necessity of adjustment by hand thereby caused made the drawbar defective; but the Massachusetts Supreme Judicial Court holds that it was for the jury to determine whether this possibility of misalignment of the drawbar rendered it defective. The jury found it was necessary for the deceased to go between the cars to set the drawbar, but not to be between the cars at the moment of coupling; and that the construction of the locomotive was not defective. Judgment for defendant.—Crowe v. B. & M. (Mass.), 136 N. E. 189.

Drover's Contract to Remain in Caboose

A drover's contract required him to "ride and remain in the caboose while the train is in motion, or about to start." When he left the train temporarily for luncheon, the train started, and by agreement with an employee he jumped on at the rear end of the caboose while the train was moving slowly. He was about to open the caboose door when a sudden stop of the train threw him against the door jamb and then to the ground. In an action for his injuries the contention that the contract was invalid because against public policy was not sustained, the making of such a rule being not only for the proper conduct of the carrier's business, but also for the safety of the passenger. The contract prevented recovery for injuries received in consequence of plaintiff's violation.—Hulet v. Payne, 282 Fed. 401.

Foreign Railway News

Coupling Devices for South Australian Railways

An important market for coupling devices for the South Australian Railways may be opened in a few months, according to Commerce Reports. The use of heavier engines and heavier trains which the new railway commissioner, who recently was placed in charge of the state railways, plans to introduce during 1923, will require a much stronger and up-to-date coupler than that now in use. As the couplings which will be required when the heavier trains are put into operation are not manufactured in Australia, American manufacturers may have an opportunity to obtain a share of this trade, according to Consul Henry H. Balch, Adelaide, in a report to the Department of Commerce.

Big Railway Projects in Spain

During 1923 the Madrid, Zaragoza & Alicante Railway proposes to double the track and re-lay the section from Cordoba to Sevilla, a distance of 112 miles with 100 lb. rails and to double the track and re-lay the rails on the lines from Port Bou to Barcelona, from Zaragoza to Madrid, and from Madrid to Sevilla, a total distance of 810 miles, according to Commerce Reports. Other projects reported to the Department of Commerce by Commercial Attache Cunningham at Madrid include the construction of stations at Sevilla and Barcelona, and a station, roundhouse, and yards at Villaverde, near Madrid, the latter involving the expenditure of 25,000,000 pesetas ($17,250,000).

The Norte railway's plans for 1923 include the laying of a double track line from Palencia to Leon, a distance of 62 miles, and the electrification of the Pajares Pass. With this purpose in view, 50,000,000 pesetas in bonds ($7,150,000), have been floated, and it is expected that this amount will be duplicated during the year. It is also expected that work will begin soon on the laying of 62 miles of double track from Valencia to Castellon.

Proposed Electrification in Spain

Representatives of Morgan & Company of New York, Messrs. Rothschild of London and Messrs. Urquijo, the Spanish bankers of Madrid and Bilbao, have recently formed a company with a capital of 500 million pesetas (approximately $100,000,000 at par exchange), to carry out the long-discussed project for an electric line between Madrid and Valencia, according to a dispatch from Barcelona to the Times (London) Trade Supplement. The line will be about 220 miles in length and double-tracked.

The project includes the development of hydro-electric power necessary for the new line, as well as the working of several mines, and other schemes of an agricultural character. It is stated that the work will be put in hand as soon as possible, embodying the proposals of the engineers, Messrs. Vallejo and Membrilla.

The capital of the new company will enjoy a state guarantee of 5 per cent interest. Besides being the first electric trunk line to be constructed in Spain, the project is one of the most important of its kind that have been launched in the country for many years. The new railway will open up a new country rich in minerals and in agricultural produce but hitherto devoid of communications.

Of the Trans-Pyrenean railways which are being constructed under the Franco-Spanish Agreement of 1904, the line from Ripoll to Puigcerdá is the only section at present in working order. The Minister of Public Works has now been authorized to ask for tenders for its electrification. The line is about 40 miles in length, with two long tunnels of a total of 3.7 miles. There are eight stations, some of which are not yet complete. The line rises to a height of 3,900 ft. in the tunnel under the Pyrenees; eventually it will connect with the French lines at Aix-les-Termes and will shorten the journey between Barcelona and Toulouse by 75 miles.

Equipment and Supplies

Locomotives

THE NEW YORK CENTRAL is asking for prices on about 20 Mikado type locomotives.

THE GREAT NORTHERN is inquiring for 15 Pacific type and 10, 2-10-2 type locomotives.

THE NEW YORK, ONTARIO & WESTERN is asking for prices on from 4 to 6 Mountain type locomotives.

THE NORTHERN PACIFIC is reported to be contemplating the purchase of 25 Mikado, 20 Pacific and 4 Mallet type locomotives.

THE DENVER & RIO GRANDE WESTERN, reported in the *Railway Age* of December 9 as ordering 15 Mallet type and 10 Mountain type locomotives from the American Locomotive Company, has increased this order to include 20 Mikado type locomotives.

THE MOBILE & OHIO, reported in the *Railway Age* of January 20 as inquiring for 6 Mikado type locomotives and 3 Pacific type locomotives, has ordered 10 Mikado type locomotives from the Lima Locomotive Works and 3 Pacific type locomotives from the Baldwin Locomotive Works.

THE QUEBEC DEVELOPMENT COMPANY, Charlotte, N. C., has ordered from the American Locomotive Company 8, 4-wheel tank engines with 14 by 22 in. cylinders and a total weight in working order of 79,000 lb., also 6, 4-wheel tank engines with 13 by 20 in. cylinders and a total weight in working order of 65,000 lb.

THE CHICAGO, ROCK ISLAND & PACIFIC reported in the *Railway Age* of January 13 as inquiring for 30 Mikado type and 10 Mountain type locomotives has ordered this equipment from the American Locomotive Company. The Mountain type locomotives will have 28 by 28 in. cylinders and a total weight in working order of 369,000 lb. The Mikado type will have 28 by 30 in. cylinders and a total weight in working order of 377,000 lb.

THE BUFFALO, ROCHESTER & PITTSBURGH has ordered 5 Pacific type passenger locomotives, 9, 0-8-0 type switching locomotives, 14, 2-6-6-2 Mallet type and 2, 2-8-8-2 Mallet type locomotives from the American Locomotive Company. The Pacific type locomotives will have 22½ by 28 in. cylinders and a total weight in working order of 244,000 lb. The switching locomotives will have 24½ by 28 in. cylinders and a total weight in working order of 231,000 lb. The 14, 2-6-6-2 Mallet type locomotives for road service will have 23½ and 37 by 32 in. cylinders and a total weight in working order of 441,000 lb., and the 2, 2-8-8-2 Mallet pusher locomotives will have 28 and 41 by 32 in. cylinders and a total weight in working order of 569,000 lb.

Freight Cars

THE BINGHAM & GARFIELD is inquiring for 100, 80-ton ore cars.

THE ST. LOUIS-SAN FRANCISCO is inquiring for 1,000 low side gondola car bodies.

THE DULUTH MISSABE & NORTHERN is inquiring for 100 box cars of 40 tons' capacity.

THE ILLINOIS CENTRAL is inquiring for 1,500 automobile cars and 500 automobile-furniture cars.

THE VERDE TUNNEL & SMELTER COMPANY is inquiring for from 10 to 15 ore cars of 75 tons' capacity.

THE LOUISIANA RAILWAY & NAVIGATION COMPANY is inquiring for 300, 40-ton steel underframe box cars.

THE CENTRAL OF NEW JERSEY is having 200 box cars repaired at the shops of the Standard Steel Car Company.

THE INTERSTATE RAILROAD has ordered 500 hopper cars of 55 tons' capacity from the Pressed Steel Car Company.

THE DELAWARE, LACKAWANNA & WESTERN is inquiring for 300 double-sheathed automobile cars of 40 tons' capacity.

THE SOUTHERN LUMBER COMPANY, Warren, Ark., has ordered 125, 50-ton logging cars from the Bettendorf Company.

THE CHERRY RIVER BOOM & LUMBER COMPANY, Scranton, Pa., is inquiring for 10 wooden flat cars of 40 tons' capacity.

THE PITTSBURGH PLATE GLASS COMPANY is inquiring for 125 hopper cars of 70 tons' capacity and 160 hopper cars of 55 tons' capacity.

THE GULF REFINING COMPANY, reported in the *Railway Age* of January 20 as inquiring for 300 tank cars, has ordered 100 tank cars from the Standard Steel Car Company.

THE MINARETS & WESTERN, reported in the *Railway Age* of December 16 as inquiring for 200, 40-ton flat cars, has ordered this equipment from the Pacific Car & Foundry Company.

THE MOBILE & OHIO, reported in the *Railway Age* of January 20 as inquiring for 800 cars, has ordered 400 box cars, 100 stock cars and 200 hopper cars from the American Car & Foundry Company.

THE CANADIAN NATIONAL, reported in the *Railway Age* of February 3 as inquiring for 1,000 automobile cars, has ordered 400 from the National Steel Car Corporation, Ltd., and 600 from the Canadian Car & Foundry Company.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of February 3 as inquiring for 500 sets of steel underframes and superstructures for box cars to be built in its own shops, has ordered this equipment from the Virginia Bridge & Iron Company.

THE CHICAGO, NORTH SHORE & MILWAUKEE, reported in the *Railway Age* of January 20 as inquiring for 20 general service cars and 15, 50-ton gondola cars, has ordered the general service cars from the Standard Steel Car Company and the gondola cars from the General American Car Company.

THE BUFFALO, ROCHESTER & PITTSBURGH, reported in the *Railway Age* of January 20 as inquiring for from 30 to 35 steel underframe caboose cars, has ordered 50 caboose cars from the Standard Steel Car Company. This company has also placed an order for 25 extension side dump cars with the Clark Car Company.

Passenger Cars

THE BUFFALO, ROCHESTER & PITTSBURGH, reported in the *Railway Age* of January 27 as inquiring for 7 coaches, 3 baggage and mail and 6 baggage cars, has ordered this equipment from the American Car & Foundry Company.

THE SOUTHERN PACIFIC is inquiring for 5, 60-ft. steel chair cars, 5, 60-ft. coaches, 15, 72-ft. coaches, 60, 72-ft. interurban cars, 7, 77-ft. dining cars, 5, 70-ft. steel baggage cars, 10, 70-ft. baggage cars with automobile end doors and 40, 70-ft. combination baggage and postal cars.

Machinery and Tools

THE TRANS-MISSISSIPPI TERMINAL has ordered one set of bending rolls from the Niles-Bement-Pond Company.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for one 16-in. by 8-ft. engine lathe, one 14-in. heavy duty slotting machine with longitudinal and cross feeds and circular table feed, two vertical high power 24-in. drilling machines with compound table and capacity to drill 4-in. holes in steel, also one 5-ft. plain heavy duty type motor driven radial drill.

Signaling

THE ERIE has ordered from the Union Switch & Signal Company a 40-lever Saxby & Farmer interlocking machine to replace one recently destroyed by fire in "HB" Tower, near Jersey City, N. J.

Supply Trade News

Wm. F. Whiteside has been appointed specialist in steam railroad electrification for **The Ohio Brass Company,** Mansfield, Ohio.

R. J. Calder, vice-president of the **International Creosoting & Construction Company,** Galveston, Tex., has been elected president, succeeding J. Sealy.

Thomas W. Delanty has joined the sales organization of the **Prime Manufacturing Company,** manufacturers of locomotive and car specialties, Milwaukee, Wis.

W. H. Holtom, road foreman of engines of the Michigan Central at Jackson, Mich., has been appointed service engineer of the **Franklin Railway Supply Company,** Inc., New York.

W. P. Thomas, road foreman of engines of the Minneapolis & St. Louis, at Marshalltown, Iowa, has been appointed service engineer of the **Franklin Railway Supply Company, Inc.,** New York.

The Elwell Steel Supply Company, 10312 Elwell avenue, Cleveland, Ohio, has been organized to deal in iron and steel bars, sheets, rails and steel axles. **A. Cohen** is president and general manager.

Edward McN. Mills, treasurer of the Buffalo Steel Car Company, Buffalo, N. Y., has resigned and **Floyd M. Wills** has been appointed treasurer to fill the unexpired term of Mr. Mills. Mr. Wills will be located at the general offices of the company.

The Portland Cement Association has opened a district office in the Hibernia Bank building at New Orleans, La. **J. E. Tate,** field engineer for North Carolina, with headquarters at Atlanta, Ga., has been promoted to district engineer in charge of the New Orleans office.

A. W. Beresford, vice-president of the **Cutler-Hammer Manufacturing Company,** Milwaukee, Wis., has resigned after 23 years of service as engineer and executive. He plans to devote considerable time to the activities of the various engineering societies of which he is a member and an executive officer.

The Conveyors Corporation of America, Chicago, has bought from the Green Engineering Company, East Chicago, Ind., all its rights to the Green steam jet ash conveyor. All orders for replacement parts and extensions to the Green conveyor will in future be filled by the Conveyors Corporation of America.

The Texas Company, Houston, Texas, has organized a western sales department, with headquarters at Denver, Colo., and established stations and other marketing equipment throughout the new territory. **Fred W. Freeman** has been appointed general western manager and **H. W. Dodge** has been appointed western sales manager.

The Westinghouse Electric & Manufacturing Company will complete about May 1, a $700,000 building at West Pershing road and Leavitt street, Chicago, which will be used as a combination district sales office, warehouse and service shop. The building will be of reinforced concrete construction, seven stories high, containing 218,000 sq. ft. of floor space. It is the first of three buildings to be erected at this location.

At the annual meeting of the **Brake Beam Manufacturers' Institute** at the Union League Club, Chicago, on January 18, the following officers were elected: **J. H. Slawson,** vice-president of the Republic Railway Equipment Company, Inc., was re-elected president; **A. H. Peycke,** manager of the brake beam department of the American Steel Foundries, was elected vice-president, and **F. T. DeLong,** vice-president and sales

manager of the Chicago Railway Equipment Company was re-elected treasurer.

W. L. Allen has been elected president of the **Kansas City Bolt & Nut Company,** Kansas City, Mo. **George T. Cook,** who has served for some time as chairman of the board, becomes chairman of the executive committee and **Solomon Stoddard,** who has been active head of the company as its president for a number of years, becomes chairman of the board. Mr. Allen until recently was vice-president and general manager of the Laclede Steel Company of St. Louis, prior to which time he was president of the Valley Steel Company, which was absorbed by the Laclede Steel Company in 1918.

At the annual meeting of the **Pollak Steel Company,** Cincinnati, O., **Emil Pollak** for many years president was elected chairman of the board of directors. **Maurice E. Pollak,** formerly vice-president was elected president. **Julian A. Pollak** was re-elected vice-president with headquarters at Cleveland and **Edward J. Schriever** was re-elected secretary. **Edgar Johnson** has been elected a director and **Charles Judah,** treasurer, was elected to the board of directors to fill the vacancy caused by the retirement of **Bernard E. Pollak,** formerly vice-president. **B. E. Pollak** has not formed any definite plans for the present. **D. E. Sawyer** has retired as general sales manager, but up to the present time he has made no announcement of his plans for the future. The general sales management of the company, formerly handled in the New York office, will be conducted from Cincinnati, but the company will maintain a sales office in the Equitable building, New York City, with **Clyde F. Hicks** as eastern representative. **Maurice E. Pollak** was born at Cincinnati, Ohio, and has lived there all his life. He attended the public school, Franklin preparatory school and the University of Cincinnati. On leaving the university he went into business with his father, Emil Pollak, and served his apprenticeship in the shops at Cincinnati, and later became superintendent of that plant, which position he held for several years. In the reorganization of the company in 1911 when the Pollak Steel Company was formed, the Pollak interests took over the Cincinnati plant from the old company, the Block Pollak Iron Company, and Maurice E. Pollak was then elected vice-president in charge of operations. The Cincinnati plant was extended during 1915, 1916 and 1917, and the Chicago plant was acquired in 1916, and has since grown in size. In 1919 the Pollak Steel Company purchased the plant of the Interstate Iron & Steel Company at Marion, Ohio, thereby acquiring another addition to its already large properties. Julian A. Pollak after graduating from Cornell College joined the company, and through his progressive work added many specialties to the business. He became vice-president in charge of operation with his brother, Maurice E. Pollak with headquarters at Cincinnati, and in the recent reorganization was re-elected vice-president. Both Maurice E. Pollak and Julian A. Pollak now control the entire business, and will maintain headquarters at the Cincinnati office, directing all policies from there.

M. E. Pollak

The Walworth Manufacturing Company, Boston, Mass., has organized the Walworth Ohio Company with general office at Cleveland, Ohio, to be conducted as a branch of the Walworth Manufacturing Company. The new company has taken over the business and property of the Hiram Rivitz Company of Cleveland. **S. R. Mitchell,** manager of the Kewanee Works of the Walworth Manufacturing Company, has been appointed vice president and general manager at Cleveland of the new Walworth Unit and will take active charge of the Walworth Ohio Company. **Wm. M. Mickleborough** has been appointed assistant treasurer.

American Steel Foundries Earnings Increase

The American Steel Foundries earned a profit of $3,709,866 during 1922 after deducting charges, federal taxes and preferred dividends of $4.03 a share on 722,195 shares of common stock, the par value of which is $33.33 a share. The net profits for the previous year were $675,009. The income account for the year with comparison follows:

	1922	1921
Earnings after expenditures and federal taxes	$4,481,840	$1,428,187
Depreciation	945,626	512,734
Balance	3,536,214	915,453
Total income	4,088,892	1,241,338
Net after charges	3,769,866	675,009

Chicago Railway Equipment Company Celebrates Thirtieth Anniversary

The thirtieth anniversary of the organization of the Chicago Railway Equipment Company was celebrated by a dinner at the Union League Club in Chicago on the evening of February 6. The dinner was attended by the directors and officers of the company and in addition, a large number of important railway officers and railway supply manufacturers. The table decorations were elaborate and typified the progress of the company during the three decades of its existence. E. B. Leigh, president of the company, in his address called attention to the fact that there are now only three persons connected with the company who were connected with it when it was organized, Mr. Leigh himself, E. T. Walker, secretary and treasurer, and Miss May Huntoon. Among those who made addresses were Frank W. Noxon, secretary of the Railway Business Association; Magnus Alexander, managing director of the National Industrial Conference Board, and J. A. Emery, general counsel of the National Association of Manufacturers. Mr. Leigh was presented by the directors and officers of the company with a book of testimonial appreciations and in recognition of their long service Mr. Walker and Miss Huntoon were the recipients of handsome gifts.

Obituary

W. P. Waugh, consulting engineer for the H. H. Robertson Company, Pittsburgh, Pa., died January 15 at Sewickley, Pa. He was born at Hedrick, Iowa, and was educated at Iowa State College at Ames, Iowa. After leaving college he was employed in the engineering department of the Chicago, Milwaukee & St. Paul at Ottumwa, Iowa, and later on the construction of the line between Ute, Iowa, and Sioux City. He left railroad service in 1888 to engage in other work. After an interval he entered the employ of the James G. Wilson Manufacturing Company at its St. Louis, Mo., office and was soon promoted to sales manager in the New York district, which position he held for 12 years. Mr. Waugh was connected with the Clason Architectural Metal Works where he developed the Waugh type of skylight. At the time of his death he was consulting engineer of the H. H. Robertson Company.

W. P. Waugh

David Reeves, president of the Phoenix Iron Company, Inc., and of the Phoenix Bridge Company, Inc., Philadelphia, Pa., died at his home in Phoenixville on February 5. Mr. Reeves was at the head of these companies since 1878.

J. J. Otley, president of the Otley Paint Manufacturing Company, Chicago, died on January 20 from cerebral hemorrhage, at Chicago.

Trade Publications

TRAIN CONTROL.—The National Safety Appliance Company of San Francisco, Cal., has recently issued Bulletin No. 1, descriptive of its intermittent induction type of automatic train control. The bulletin consists of 20 pages containing a description of the apparatus, well illustrated with halftones and drawings. The operation of the apparatus is described and part of the bulletin is devoted to circuits, speed control and special operating features of the type.

ELVIN MECHANICAL STOKER.—A Service Hand Book and Shop Manual, No. 2, has been issued by the Elvin Mechanical Stoker Company, 50 Church street, New York. This booklet, which is of pocket size and contains 130 pages, describes the various parts of the stoker and gives instructions for operation, inspection and maintenance. A series of plates, with part numbers and tables of the proper names of all pieces, will be of assistance to those who have to call for or order repair parts.

THE AMERICAN SOCIETY FOR TESTING MATERIALS has published in pamphlet form a list of alloys which is taken from the report of the committee on Non-Ferrous Metals and Alloys presented at the last annual meeting of the society. This list contains the chemical composition of approximately 1,500 alloys, divided into 17 groups, the alloys in each group being arranged alphabetically. Among the important alloys listed are 275 of brass, 260 of bronze, 165 of nickel silver, 140 of aluminum, 130 of tin base and 105 of lead base.

SEAMLESS BOILER TUBES.—Bulletin No. 12 covering the properties, use and manufacture of Shelby seamless hot rolled boiler tubes is a valuable addition to the series of bulletins issued by the National Tube Company, Pittsburgh, Pa. The details of manufacture are clearly described and the text is accompanied by many illustrations. In addition to information in regard to physical and chemical properties and tests there are a number of tables covering tubes ranging from 2-in. to 6-in. diameter which are of value to users of such material.

APPLYING SCIENCE TO INHIBIT RUST.—This is the title of a booklet just issued by the Dearborn Chemical Company, Chicago, describing No-Ox-Id, a recently developed compound for use in protecting iron and steel surfaces against rust. A wide range of applications of the compound, which not only protects by providing a surface covering but chemically inhibits the tendency toward corrosion under the ordinary protective coating, are set forth in the booklet, together with directions for its application by dipping, brushing or spraying, under a wide range of conditions.

WEBB AUTOMATIC TRAIN STOP.—The International Signal Company, Grand Central Terminal, New York City, has issued a handsome 25-page illustrated booklet 8½ in. x 11½ in. describing the Webb automatic stop. The description is very full, detailed and clear and the illustrations are fully lettered. Up to the end of 1922, the two Erie Railroad locomotives equipped with this stop had run 5,537 miles, involving 5,309 operations of the apparatus, with no failures of any kind. A statement is given of the average maintenance costs for 15 months, showing 55 cents a month for each engine equipment and 10½ cents per month per block for roadside equipment.

FEED WATER TREATMENT.—The scientific handling of serious water problems confronting both railroad and industrial users of steam boilers is the subject of a brief but forceful little booklet recently issued by the Dearborn Chemical Company, Chicago. This booklet shows how the Dearborn organization, with 35 years' experience in treating feed water, goes into the matter for its clients from every angle, including (1) the complete mineral analysis; (2) study of plant equipment and operating conditions; (3) expert advice and assistance from the standpoint of practical power production engineering; (4) followed up with laboratory control after treatment is installed, the water being analyzed from time to time and the material adjusted to suit changing conditions that may develop.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will construct eight miles of third main track from Emporia, Kan., to Plymouth, reported as contemplated in the *Railway Age* of January 27.

ATCHISON, TOPEKA & SANTA FE.—This company has authorized the following construction work at Emporia, Kan., which was reported as contemplated in the *Railway Age* of February 3: One 120 ft. turntable, a 43-stall roundhouse, a 1,000 ton coal chute, cinder pits, oil and water crane with necessary tracks, a blacksmith building, lavatory and roundhouse office building and car repair yard facilities.

CHICAGO, BURLINGTON & QUINCY.—This company has authorized the construction of a four-story, 796 ft. by 110 ft., reinforced concrete and steel outbound freight house at Canal and Polk streets, Chicago. A viaduct adjoining the recently completed inbound freight house will be extended north to Harrison street. Bids for the construction of caisson foundations for the new freight house and viaduct have been received and bids for the construction of the main building and the superstructure of the viaduct will be called for about May 1.

CHICAGO NORTH WESTERN.—This company will construct two subways for the extension of Ogden avenue, Chicago, to cost approximately $300,000. This company also contemplates the construction of a one-story boiler house and machine shop at Winona, Minn.

CHICAGO, ROCK ISLAND & GULF.—This company has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the construction of a 300-ton, 2-track coaling and sanding station at Amarillo, Texas.

CHICAGO, ROCK ISLAND & PACIFIC.—This company contemplates the construction of nine miles of second track and the extension of yards and buildings at Herington, Kan.

LOUISIANA RAILWAY & NAVIGATION COMPANY.—This company has secured a location for a new passenger station at New Orleans, La., and is now preparing plans for the construction of the building.

MISSOURI PACIFIC.—This company has been ordered by the Louisiana Public Service Commission to construct a freight and passenger station at Delco, La., plans for which are to be completed within 30 days.

NATIONAL RAILWAYS OF MEXICO.—This company plans the construction of a new line from Calexico, Cal., through Lower California to Port La Bomba, Mexico, on the gulf of California, a distance of 90 miles.

NEW YORK CENTRAL.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a 100-ton two track, reinforced concrete automatic electrically operated locomotive coaling station at North Judson, Ind.

PENNSYLVANIA.—This company contemplates the construction jointly with the Baltimore & Ohio, Erie and the City of Akron, Ohio, of a bridge at North Arlington street, Akron, 2,000 ft. long and of concrete or steel construction.

PERE MARQUETTE.—This company is reported contemplating the construction of new engine houses and shops at Detroit, Mich., and Toledo, Ohio, to cost approximately $600,000 and $100,000 respectively.

TENNESSEE, ALABAMA & GEORGIA.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Gadsden, Ala., to a connection with the Seaboard Air Line near Odenville, Ala., approximately 36 miles, with a branch of about 5 miles.

UNION PACIFIC.—This company is calling for bids for the construction of a new terminal at Los Angeles, Cal., as reported in the *Railway Age* of December 23.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*New Director.*—Myron C. Taylor has been elected a director to succeed T. DeWitt Cuyler, deceased. W. C. Potter, of the Guaranty Trust Company, has been elected to take Mr. Cuyler's place on the executive committee.

BALTIMORE & OHIO.—*Equipment Trust Authorized.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of $13,875,000 of equipment trust certificates to be issued by the Girard Trust Company of Philadelphia and sold at not less than 96.67.

CHESAPEAKE & OHIO.—*Operations in 1922.*—See article on another page of this issue entitled "Chesapeake & Ohio Had Eventful Year in 1922."

CHICAGO, ROCK ISLAND & PACIFIC.—*Asks Authority to Acquire Line.*—This company has applied to the Interstate Commerce Commission for authority to acquire by purchase the line of the Rock Island & Oklahoma, which it now operates, and to issue against the purchase $452,000 of first and refunding mortgage 4 per cent gold bonds. The line runs from Chattanooga to Grandville, Okla., 14.95 miles.

DETROIT, TOLEDO & IRONTON.—*To Examine Henry Ford.*—In a decision handed down by Justice Gavegan in the Supreme Court of New York, Henry Ford has been ordered to stand examination by a commission in regard to the affairs of the Detroit, Toledo & Ironton of which road he is president. The decision was given in favor of Leon Tanenbaum, a small stockholder, who is seeking to obtain a permanent injunction to restrain the execution of a lease of the railroad properties.

LEHIGH VALLEY.—*New Segregation Plan Filed.*—The modified plan of the Lehigh Valley Railroad Company for the segregation of its coal properties was filed in the United States District Court of New York on February 7 and will be heard some time after the middle of this month. The attorney general will offer two suggestions for the court's consideration of the plan, which is understood to be substantially acceptable.

The plan provides for creation of a $40,000,000 50-year 5 per cent bond issue by the Lehigh Valley Coal Company, $15,000,000 of which will be sold at once to pay the railroad for its claims on the coal company, the remainder to be used to retire $11,514,000 present outstanding coal company bonds due in 1933, or for any improvements the coal company may consider necessary.

The railroad will sell for $1,212,100 its interest in the coal company to a trustee who will issue the same amount of certificates bearing the value of one share of coal company stock to each railroad stockholder for $1. Railroad stockholders must dispose of either their railroad or coal stock holdings before December 31, 1927. The coal company will withhold dividends from Lehigh Valley Railroad stockholders until they have disposed of their railroad stock and railroad stockholders may not acquire additional coal company stock before December 31, 1927.

The stock of Coxe Brothers & Co., Inc., will remain in pledge under the collateral trust agreement until maturity February 1, 1926, when it will be sold by the railroad. The stock of the Delaware, Susquehanna & Schuylkill Railroad will likewise remain in pledge under the same trust until 1926, application to be made in the meantime to the Interstate Commerce Commission for authorization to merge with the Lehigh Valley Railroad. The plan further stipulates that the Lehigh Valley Coal Sales Company may enter into a sale contract with the Lehigh Valley Coal Company and Coxe Brothers & Co., Inc.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Equipment Trust Authorized.*—The Interstate Commerce Commission has authorized this company to assume obligation and liability in respect of $2,360,000 of equipment trust certificates to be sold at not less than 97.4.

NEW ORLEANS, TEXAS & MEXICO.—*Dividends Increased.*—This company has declared a quarterly dividend of 1¾ per cent on the capital stock, payable March 1 to stock of record February 19. Previously the company had been paying 1½ per cent quarterly.

TEXAS & PACIFIC.—*Bill to Authorize Increase in Capitalization.*—The House on February 5 passed the bill which had previously been passed by the Senate amending the act of incorporation of this railroad in order to remove the limitation of stock issues to $40,000 a mile and a total of $50,000,000. The bill would permit it to increase its stock with the permission of the Interstate Commerce Commission to an amount not exceeding $75,000,000.

Treasury Payments to Railroads

Since last announcement, dated January 2, 1923, payments under Sections 204, 209, 210 and 212 of the Transportation Act, 1920, as amended, have been made by the Treasury as follows:

Section 204—	
Colorado-Kansas Railway	$2,237
Gulf Ports Terminal	11,018
Hillsboro & North Eastern	7,219
Indiana Northern	14,689
Winfield Railroad	16,432
Yosemite Valley	126,508
Section 209—	
Atlantic Northern	1,904
Central of Georgia	298,924
Chicago & Western Indiana	93,033
Gulf Ports Terminal	4,978
Louisville & Wadley	920
Maryland & Pennsylvania	7,063
Mississippi River & Bonne Terre	74,629
New York & Pennsylvania	12,579
South San Francisco Belt Railway	8,287
Sylvania Central	2,299
Texas Short Line	3,276
Wadley Southern	7,767
Wisconsin & Michigan	12,896
Wrightsville & Tennille	26,079
Section 210—	
Chicago, Milwaukee & St. Paul	10,000,000
New York, New Haven & Hartford	500,000
Norfolk Southern	142,000
Wheeling & Lake Erie	100,000
Section 212—	.....
Total	$11,474,737

Total payments to January 31, 1923—		
(a) Under Section 204, as amended by Section 212 for reimbursement of deficits during federal control:		
(1) Final payments, including partial payments previously made	$4,787,805	
(2) Partial payments to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	995,438	
Total payments account reimbursement of deficits		$5,783,243
(b) Under Section 209, as amended by Section 212 for guaranty in respect to railway operating income for first six months after federal control:		
(1) Final payments, including advances and partial payments previously made	120,961,246	
(2) Advances to carriers as to which a certificate for final payments has not been received by the Treasury from the Interstate Commerce Commission	207,105,922	
(3) Partial payments to carriers as to which a certificate for final payment has not been received, as stated above	124,943,422	
Total payments account of said guaranty		453,010,590
(c) Under Section 210 for loans from the revolving fund of $300,000,000 therein provided		329,028,667
Total		$787,822,500
Repayments of loans have been made to the amount of		$140,753,497

Dividends Declared

Cleveland & Pittsburgh.—Guaranteed, quarterly, 87½ cents; special guaranteed, quarterly; both payable March 1 to holders of record February 10.

Cripple Creek Central.—Preferred, 1 per cent, payable March 1 to holders of record February 15.

New Orleans, Texas & Mexico.—1¾ per cent, quarterly, payable March 1 to holders of record February 19.

Trend of Railway Stock and Bond Prices

	Feb. 6	Last Week	Last Year
Average price of 20 representative railway stocks	68.34	66.32	59.98
Average price of 20 representative railway bonds	85.50	84.54	82.05

Railway Officers

Financial, Legal and Accounting

H. S. Marx has been appointed general counsel of the American Railway Express.

J. L. Morecock has been appointed superintendent of insurance of the Seaboard Air Line with headquarters at Portsmouth, Va.

W. G. Hunt, assistant auditor of disbursements of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has been promoted to assistant auditor of the Coast Lines, with headquarters at Los Angeles, Cal., succeeding C. W. Sowle, resigned.

Operating

J. J. Ross, superintendent of telegraph of the Michigan Central, with headquarters at Detroit, Mich., has had his jurisdiction extended over the Chicago, Kalamazoo & Saginaw, with the same headquarters.

H. N. Rodenbaugh, whose promotion to general manager of the Florida East Coast was announced in the *Railway Age* of February 3, page 359, was born at Norristown, Pa., on November 20, 1879, and was graduated from the University of Pennsylvania in 1901. He entered railway service in January, 1902, as a draftsman in the office of the chief engineer of the Norfolk & Western, leaving that company in July, 1903, to go with the Alan Wood, Iron & Steel Co., Conshohocken, Pa., as yard superintendent. In June, 1904, he returned to railway service as an assistant engineer in the office of the chief engineer maintenance of way and structures of the Southern, with headquarters at Washington, D. C. He left the Southern in October, 1905, to become assistant engineer of bridges and buildings on the Carolina, Clinchfield & Ohio at Bristol, Va. In June, 1906, he was appointed principal assistant engineer of the Virginia & Southwestern and left this position in January, 1908, to become structural engineer of the Philadelphia & Reading, with headquarters at Philadelphia, Pa. In June, 1909, he returned to the Southern as an assistant engineer of bridges, serving subsequently as an engineer in charge of terminal construction, supervising engineer, principal assistant engineer, valuation department, until July, 1918, when he was appointed engineering assistant to the regional director of the Southern region of the Railroad Administration. In March, 1920, he was promoted to regional engineer of the Southern and Pocahontas regions, serving in this capacity until later in the same year when he was appointed chief engineer of the Florida East Coast with headquarters at St. Augustine.

H. N. Rodenbaugh

R. B. Croll has been promoted to superintendent of car service of the Chicago Great Western, with headquarters at Chicago. Mr. Croll was born on April 17, 1886, at Frankfort, Ind. After graduating from high school he attended the University of Indiana for a short time. He left school on September 4, 1905, to enter the service of the Toledo, St. Louis & Western at Frankfort as a clerk in the office of the superintendent of car service and the superintendent of transportation. He was later promoted to chief clerk and served in this capacity until November, 1916, when he was appointed superintendent of car service of the Ft. Smith & Western with headquarters at Ft. Smith, Ark. In September, 1917, he was promoted to superintendent of both the operating and car service departments. He resigned from this position in December, 1921, to enter the service of the Chicago Great Western as transportation inspector with headquarters at Chicago and was serving in this capacity on February 1, when he was promoted to superintendent of car service.

W. H. Comstock, who has been serving as a member of the Train Service Board of Adjustment for the Western Region, has resumed his duties as general manager of the Los Angeles & Salt Lake with headquarters at Los Angeles, Cal. **N. A. Williams,** acting general manager with headquarters at Los Angeles, has been appointed general superintendent with the same headquarters.

Traffic

C. H. Walden has been appointed contracting agent of the El Paso & Southwestern, with headquarters at San Francisco, Cal.

A. N. Heuss has been appointed assistant to the general freight and passenger agent of the Manistee & Northeastern, with headquarters at Manistee, Mich.

T. J. Cummins has been appointed general agent of the Chicago, Burlington & Quincy, with headquarters at Butte, Mont., succeeding L. J. Doran, resigned.

W. J. Davies, assistant trainmaster of the Chicago & Alton with headquarters at Alton, Ill., has been promoted to general agent, operating department, with headquarters at Chicago, succeeding C. M. Teschemacher recently promoted to assistant general freight agent.

Engineering, Maintenance of Way and Signaling

W. Featherstonhaugh, acting district engineer of the Canadian National with headquarters at Prince Rupert, B. C., has been transferred to Calgary, Alberta.

L. L. Lyford, chief clerk to the chief engineer of the Illinois Central with headquarters at Chicago, has been promoted to assistant engineer in charge of the Markham yards construction with, headquarters at Harvey, Ill.

Special

J. W. Slack, Jr., has been appointed supervisor of the wage bureau of the Long Island, with headquarters at New York. He will report to and receive instructions from the general superintendent, to whom any question dealing with rates of pay, rules or working conditions will be transmitted for decision, in accordance with present practice.

Obituary

T. J. Whisenand, formerly superintendent of the Panhandle division of the Atchison, Topeka & Santa Fe, with headquarters at Wellington, Kan., died on December 27 at Topeka, Kan. He had retired from active service in January, 1912.

U. S. Stewart, secretary and treasurer of the Rio Grande, El Paso & Santa Fe, with headquarters at El Paso, Tex., died at his home in that city on January 9. He was born on December 6, 1864, in Leavenworth, Kan., and moved to El Paso in July, 1887, when he entered the service of the Atchison, Topeka & Santa Fe as cashier in the El Paso transfer station. A year later he left railroad service to enter the banking business, but in the early nineties he was appointed treasurer of the Rio Grande, El Paso & Santa Fe, performing these duties in conjunction with the banking business. Following the reorganization of the company in 1910, he was again appointed treasurer, and served in this capacity until his death.